MODEL AIRPLANE NEWS

8th Year of Publication

MAY
1937
20c

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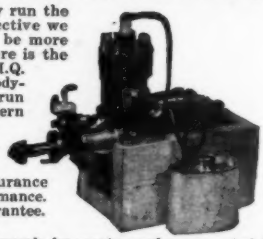

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The G.H.Q. Motor is priced especially low so that you may deal direct with our factory. Even though dealers have asked to handle this product, we have not been able to give them a special dealer's price. This famous motor, complete, entirely assembled on stand, tested and run before shipment, performance guaranteed. No oil, gas or batteries included. Postpaid for only $12.50. Free—one finished fly-wheel mounted on motor with every finished motor..... $12.50

G. H. Q. GAS KITS

Here is your opportunity to obtain a kit of this famous motor. Assemble it easily yourself and save money. Everything is in the kit including plug, coil, condenser, tank, ignition wire, cylinder, piston, connecting rod, timer, crank-shaft, all screws, nuts, bolts, etc. No oil, gas, batteries, or propeller included. Postpaid for only..... $8.50

STANDARD WARRANTY

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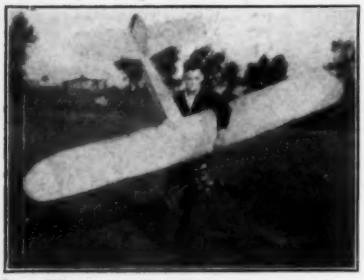
G. H. Q. SCORES AGAIN!

Modern Mechanix contained the following editorial in its April issue

Gasoline powered airplane models are finding great favor with aviation fans and a $3 prize was awarded to Francis Kosanda, of Hopkins, Minn., for his interesting letter:



Francis Kosanda, of Hopkins, Minn., holds gasoline powered model he and Robert Apgar constructed. On its initial flight, the 9-foot model flew out of sight but was recovered again.

Dear Editor: Hopkins, Minn.

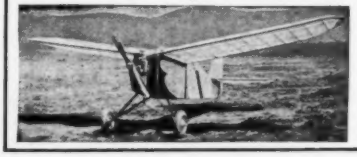
Enclosed is a photo of a gas powered model airplane built by Robert Apgar, of Minneapolis, and myself. It is of original design and powered with a G. H. Q. motor.

The model weighs five and one-half pounds, has a wing span of nine feet, and an aspect ratio of 8-1. On a test flight the model went out of sight after ten minutes, but was later recovered from a tree overhanging the Mississippi River.

Your articles on gas engines, gas models, and model airplanes are excellent. Francis Kosanda.

Judging from the report, the gas model must be an excellent cloud chaser and we are glad it was recovered without serious damage.

G. H. Q. SPORTSTER KIT



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5 ft. Flying Scale Models 1/3 size of real planes!

$1 EACH PLUS 35c for PACKING, POSTAGE & INSURANCE

IF EXPRESS COLLECT SEND ONLY $1.00

These are the giant models that have amazed the model builders of America. Imagine strong outdoor flyers that are actually one-third the size of passenger carrying planes—a $10 value for only $1.00. Everything is in the kit including all liquids—nothing else to buy!

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"California Champion"

SPECIAL KIT OFFER

At only slight additional cost you can get the "California Chief" Kit and special hardwood prop which have been specially designed for your "Baby Cyclone" Engine. A simple design for inexperienced builders. Hundreds now flying with championship performance. 5-foot wing span, assembled landing gear and all parts supplied and easy to assemble with full size plan instructions. Fill out the coupon immediately.

Now also available the record-holding "California Champion" Kit—an advanced design for experienced builders—that gives you the finest model airplane specially designed for your "Baby Cyclone" which money can buy. High wing, open cockpit design, 5-foot wing spread, with all parts supplied, together with full size plan drawing and instructions. Use the handy coupon NOW

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"Baby Cyclone" Engines are the ONLY miniature power plants using the proven rotary valve principle (which gives 25% more power than the usual 2-stroke engines)—and the same principle as used in the new outboard motorboat engines. They have demonstrated their unbeatable stamina, endurance and positive long life operation by running more than 100 gruelling hours wide open under supervised test. Two strictly stock Model D "Baby Cyclone" Engines completed this spectacular run with a perfect score—a record no other engine has dared to attempt. This is proof positive to you that the "Baby Cyclone" is the ONE engine you, too, can depend on when you get in hot competition. "Baby Cyclones" are backed by the reputation of an old reliable firm in which you can have complete confidence. Send the coupon NOW.

MAJOR C. C. MOSELEY, Pres.
Aircraft Industries, Grand Central Air Terminal, Glendale, Cal.

- ☐ Send me postpaid your special offer of new Model D Engine at $17.25 plus prop and California Chief Kit at $5.00 for which I enclose P.O. money order for $22.25.
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Model AIRPLANE News

8th YEAR OF PUBLICATION

VOL. XVI *No. 5*

Edited by Charles Hampson Grant

CONTENTS

MAY, 1937

In Our Next Issue

The Koolhoven Pursuit, by Robert V. Smith, gives you complete details of how to build a flying scale model of the fastest and most beautiful pursuit ship in the world. The model is accurate to scale and a beautiful flier.

On the 10th anniversary of Lindbergh's flight, **The Plane That Flew to Paris,** by Jesse Davidson, tells you of many secret details of Lindbergh's historic ship, the Spirit of St. Louis, and shows you how to incorporate them in one of the finest scale models of it that has ever been built.

How to Adjust Your Outdoor Models, by Vernon Boehle, gives information that is invaluable to serious model fliers who desire to build and fly record breakers.

Building the Nimbus Gas Model, by Benjamin Shereshaw, shows the gas power fan how to create a gas model of advanced design and performance.

A Tube Tractor for the Experimenter, by Walter Farynk, tells you how to build a test flier that is a beauty when on the ground or in the air.

You will also have articles such as **Designing Your Model for Duration, Frontiers of Aviation, Gas Lines, Air Ways,** and 3 view drawings which provide a wealth of information invaluable to those who are seeking a career in aviation by means of model aviation.

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Featuring Jane Withers . . . .

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A 20th Century-Fox Production

Wherever You Live I Offer You Conclusive Proof It's The World's Finest Gas Job!

All You Have To Do Is See "The Holy Terror" . . . and You'll Be Convinced I'm Right.

Here's a chance for you gas model fans to see the job that has stolen the show in the gas model field. It is your opportunity to check up on all the things we have told you. You'll admire the graceful lines, the smart appearance, the flyability, the speed and the power of the "Denny Jr." You will know why our friends are so enthusiastic in their praise. You will realize why leading Hollywood studios demand Dennyplanes when model planes are required for filming. And I know you will want the fun of building and flying a "Denny Jr."

A Sensational Low Price!

This championship kit contains finished spun cowl, finished propeller, cut out ribs, finest ivory silk covering, selected balsa and bass wood, ample supplies of cement and dope. Swedish steel landing gear wire, 3½-inch pneumatic wheels complete full-size plans, haskalite and metal for firewall, motor mount—etc., etc., with all screws, nuts and bolts necessary... Kit Complete (less motor) .....only

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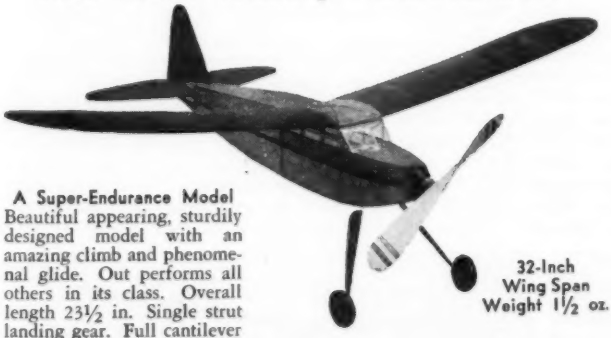

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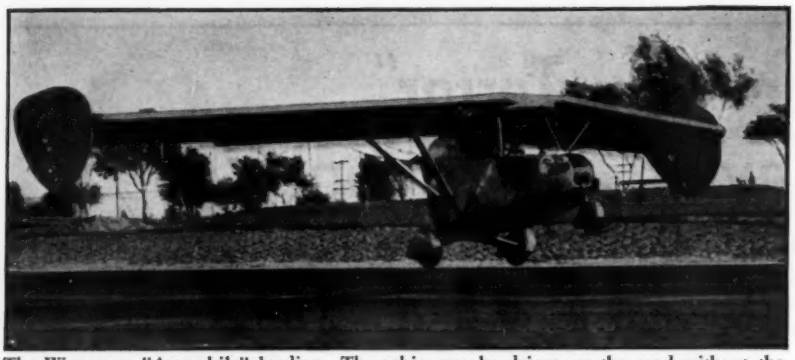
What's New In Planes

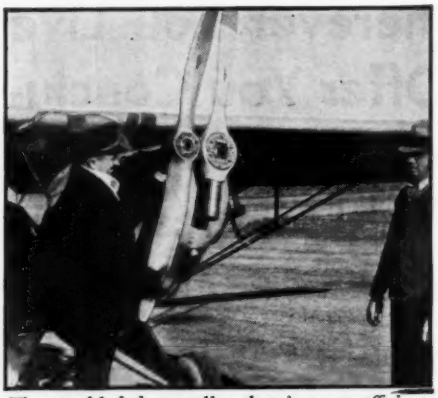
Startling New Developments That Hint at the Future of Aviation—How to Build the Lockheed 14

By ROBERT C. MORRISON



The Waterman "Arrowbile" landing. The cabin may be driven on the road without the wings. (Acme)

THE "fliver plane" is holding its own these days. In looking back over the past year one can easily foretell the future of these small "run-abouts" of the air. There was an enormous amount of them sold during 1936. Their price has gone down and their quality has increased considerably, and obvious is the swift progress they will make in the next few years, paralleling the trend of the automobile industry. Many newcomers have come into this light plane industry, but the "old-timers" still seem to be leading the show. Taylor Cubs and Aeroncas have been the best sellers.



The one-bladed propeller that is more efficient than a two-bladed one. (Univ. Newsreel from Soibelman)

At the New York Aircraft Show recently held the light planes certainly predominated, and the same thing is likely to occur at this year's Los Angeles Show. We wonder if this "flivver plane" industry is quickly reaching the boom stage?

That year-old rumor that Howard Hughes may produce a new light plane is still floating around in the air but as yet nothing has been said to quell or confirm it. However, Aeronca has come forth with a new high-wing monoplane that has many improvements over its former one. No more cabane struts or wires. The wing of the new sleek ship is strut-braced. The 1937 Aeronca has a larger cabin and luggage compartment. Visibility is excellent. Its builders claim that it has the mechanical advances and engineering refinements heretofore confined to planes selling at $6,000. It has swift looking "lines" and is "clean cut."

The new giant 32 passenger Boeing transport of 4800 hp., built for stratosphere flying. (Acme)

Of interest are the dual wheel controls in the cabin in place of the single "joy stick" as formerly used. They come out of the dashboard as on the Stinson Reliants.

Specifications of the new Aeronca known as Model K are as follows:

Wing span—36'.
Length—20' 7".
Height—6' 7".
Weight empty—590 lb.
Useful load—450 lb.
Gas—10 gal.
Oil—3 quarts.
Gross weight, 1,040 lb.
Engine—Aeronca E-113C, 40 hp.
High speed—93 m.p.h.
Cruising speed—85 m.p.h.
Landing speed—35 m.p.h.
Rate of climb—450 ft. per min.
Service ceiling—12,000 ft.
Cruising range—250 miles.

The Model K will sell for $1,590 and later may be available with Edo floats.

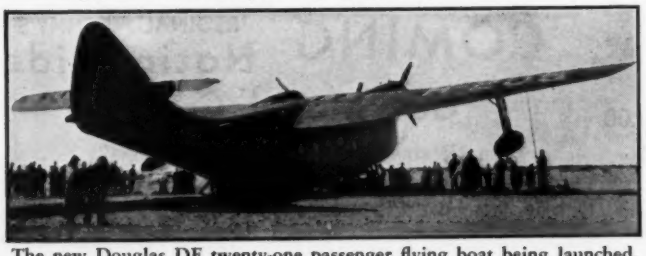
It is good to see an old-timer like Mr. Horace Keane once more enter the limelight with a new light plane. His ships are destined to gain widespread popularity.

Casey Jones' school has built a light amphibian which was shown at the New York show and a new version of the Rearwin Speedster is now available.

Throughout the country hundreds of light planes are being built, secretly and otherwise, and MODEL AIRPLANE NEWS will try to bring you news of these from time to time.

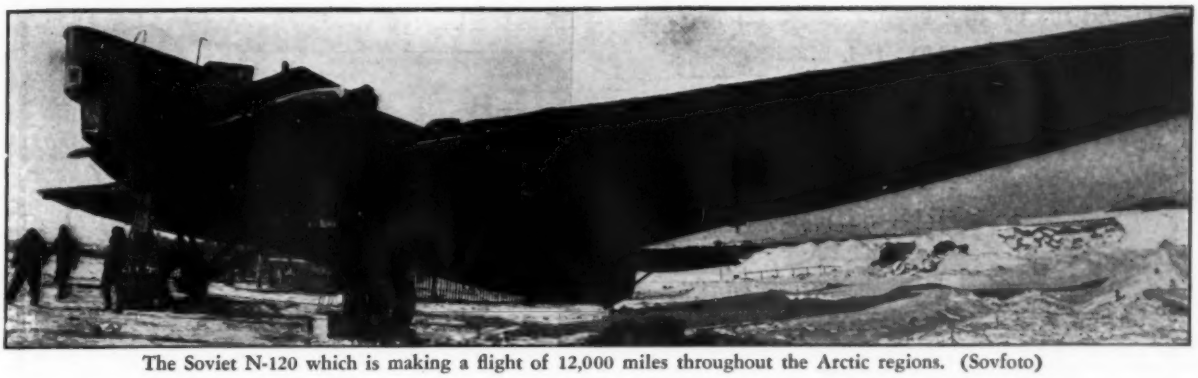
As a Duesenberg is to a Ford so is the forthcoming twin-engined Bellanca to the light plane. The Bellanca concern has definitely entered the all-metal production field and will soon come forth with a full cantilever monoplane with retractable landing gear. The engines may be Menascos as mentioned in former issues of this magazine. The cabin will hold about five people.

The Bellanca people also have under construction a new full-cantilever monoplane racer which will be a greatly improved and modernized version of James Mollison's trans-Atlantic airplane. It is being built for the New York-Paris race and therefore it must be a twin-engined airplane in order



The new Douglas DF twenty-one passenger flying boat being launched. The wing floats are retractable. It is powered with two 1100 horsepower motors. (Morrison)

The first airplane to be flown by man power alone, shown in flight in Milan, Italy. (International)



The Soviet N-120 which is making a flight of 12,000 miles throughout the Arctic regions. (Sovfoto)

to qualify though there is rumor to the effect that it is only single-engined. Capt. Papana, Roumanian aviator, will be the pilot.

A plane that would be a very outstanding entry in that New York-Paris Race is the new Lockheed 14 now being completed. Here is the dope on it as we have gathered it and knowing the wonderful organization which Lockheed is, can vouch for the accuracy of the figures, though phenomenal they may seem. Top speed is 265 m.p.h.! The cruising speed is 240 m.p.h., and the ship will land at about 60 m.p.h. using a new Lockheed-Fowler flap. Powered by two 840 hp. Wright Cyclones the Lockheed 14 will take off in eleven seconds with a run of 610 feet! The chief advantage of the Lockheed-Fowler flap is that it may be used in take-off as well as landing because it does not set up as much drag as most other conventional flaps. This flap slides out from the leading edge and then down, making a greater wing area. Much consideration is being given to flaps these days because that and stratosphere flying appear to be the only means at present for increasing the performance to any considerable extent. There are a few new flaps under development now, the most outstanding of which is one that spreads from the rear spar of the wing to the trailing edge and is variable in camber. Its construction is very simple and will be a great forward step in the design of our future airplanes.

Specifications of the Lockheed 14 are:
Capacity—11 passengers, 3 crew.
Wing span—65½ feet.
Length—44′ ¼″.
Height—11′ 5½″.
Cabin height—6′ 3″.
Cabin length—19′.
Cabin width—65½″.
Gross weight—15,000 pounds.
Absolute ceiling—5 miles plus.

The swift transport will operate with one engine at 14,000 feet altitude. From the appearance of drawings of the new Lockheed creation, the first of which should be completed in April, it will be very maneuverable because the bulk of the loads is located very close to the center of gravity. The ship is a mid-wing, a feature which not only gives more speed but also affords a place in the belly of the fuselage to store a great part of the baggage. No ladders are therefore needed to load and unload the plane, as necessary on most of our present airliners.

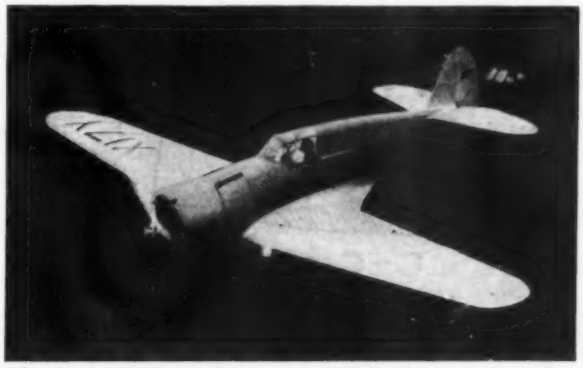
In the past year the Lockheed concern has added considerably to the equipment of their factory, the main acquisition being a new $28,000 press. Liberal use will be made of duralumin forgings in the new ship. The walls of the wing and the webs inside will form the sides of the fuel tanks, there being no integral tank used as formerly. This weight saving method is now used by Army Seversky ships.

With a top speed of 265 m.p.h. we wonder if it could not beat England's pet Blenheim bomber that there has been so much talk about.

Now that Lockheed has completed plans for the Model 14 it is rumored that they have already begun to lay plans for the Model 16 which will probably take on the proportions of the Douglas DC-2. Speaking of Douglas, they are well under way with the design of a new bomber to give North America much competition in the forthcoming contest at Dayton. The ship will be an improved version of Douglas' YB-18 which they have yet to produce in overwhelming numbers. It will have a very "snowzy" nose, but we are sorry we cannot publish any detailed

(Continued on page 36)

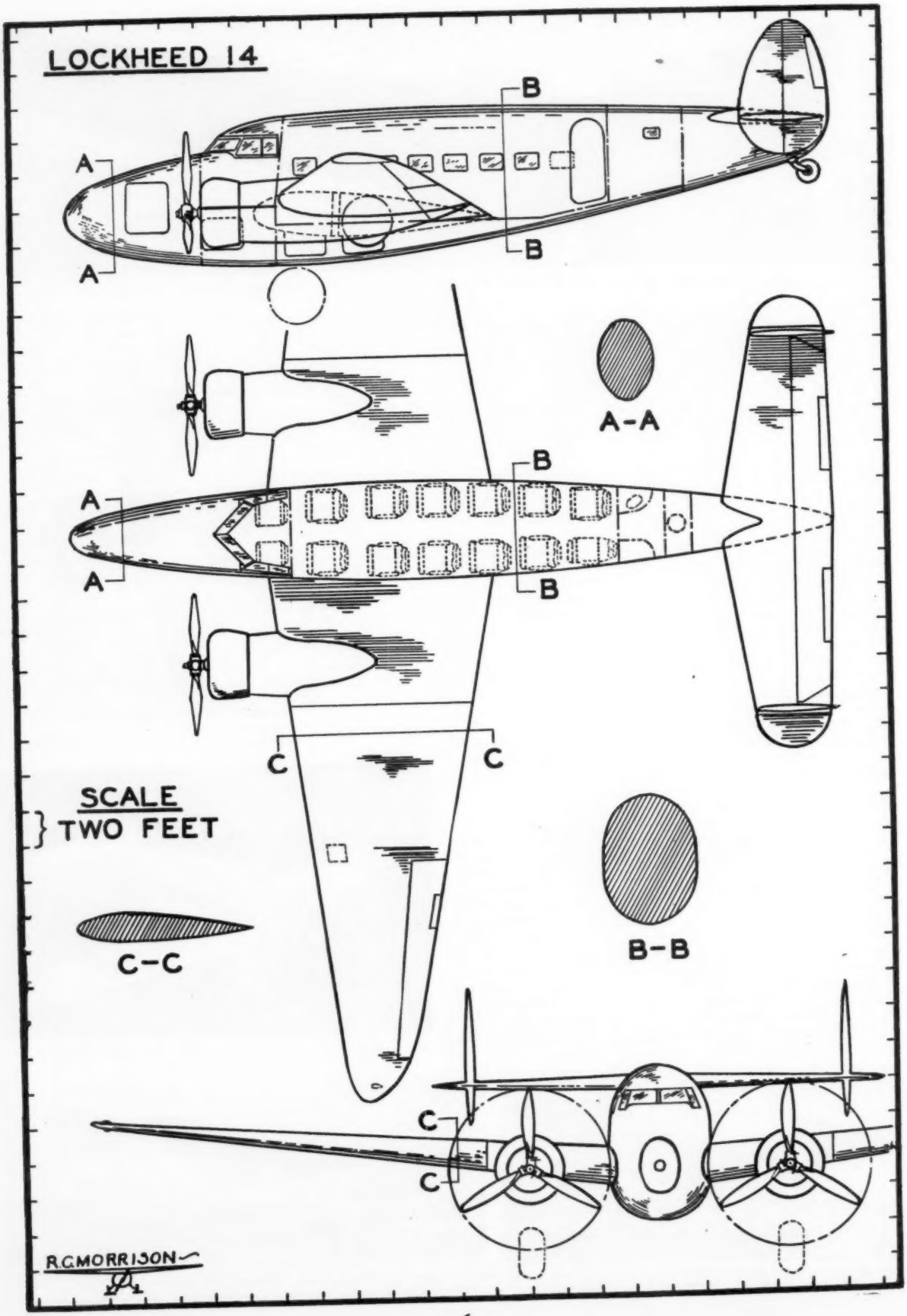
The Breguet gyroplane stays aloft for 62 minutes and hovers in one spot. (Acme)



The Curtiss "75" pursuit plane, one of the latest produced for the U.S. Army

The latest Soviet high speed transport, the ANT-35. It is the first super streamline Soviet plane. (Sovfoto)

Here is the new Harrow type Handley Page bomber and troop transport. It is heavily armed, carrying a gunner in its tail. (Globe Photo)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Indoor Plane Facts

Vital Suggestions on Adjusting Indoor Planes That Will Help You to Improve Your Flying Technique and Win Contests

By CARL GOLDBERG

The author in the act of "refueling" at the Indianapolis 1935 contest

IN THE past ten years, thousands upon thousands of indoor models have been built and flown. In 1927, the world's record was two minutes fifty-seven seconds. Today it stands at twenty-five and a half. Designs have improved enormously, but that isn't the whole story. The greatest improvement has taken place in the builders themselves; they have gone a long distance on the road to getting the most out of a ship. For many years, leaders have acknowledged the fact that knowing how to fly a ship is more important than knowing how to build it, as far as getting the most duration is concerned. As an example, consider this: you may copy a ship capable of ten minutes, and follow the plans well except for making the parts rather heavy. Now, if you know how to fly it well, you can get about eight minutes, and the ship will be consistent because it is strong. However, supposing you built it just as light as the original, but didn't know how to adjust it or wind it. Then you would have an awful time getting more than three or four minutes.

The reasons for this are simple. First, so many details are vital to successful flight, if any one of them is poorly taken care of, the flight will be poor. Second, since airplanes are what they are (temperamental creations of human beings who make mistakes), each one has to be coaxed, coddled, nursed, slapped, broken, patched, and otherwise "brought up," before it will act respectably.

Why is it, then, that so little knowledge of flying and adjusting has found its way into print? Dozens of articles on how to build this or that particular ship have been published, but the most important end, the "inside dope" on how to FLY the ship, was usually confined to a mere sentence, or at most a paragraph. It is to help correct this general lack of printed information that this article is written. Study it—and if some things are left out that you would like to know about, or if an idea needs further explanation, write in to the author or MODEL AIRPLANE NEWS, and another article will be presented dealing with what you want.

In explaining how to handle an indoor model to get the most out of it, it is necessary first to imagine a "perfect" adjustment. This consists, in general, of the following: 1. Wing set at a positive angle of incidence, offset on the clips to the left (looking from the rear), and having a shade of washin also on the left half of the wing. 2. Stabilizer set at zero angle of incidence if of the lifting type, or set at a slight *positive* angle if it is non-cambered. The idea of a large positive stabilizer was pioneered by Mr. Grant, editor of MODEL AIRPLANE NEWS for many years. It was explained by him to this writer as long ago as 1929.

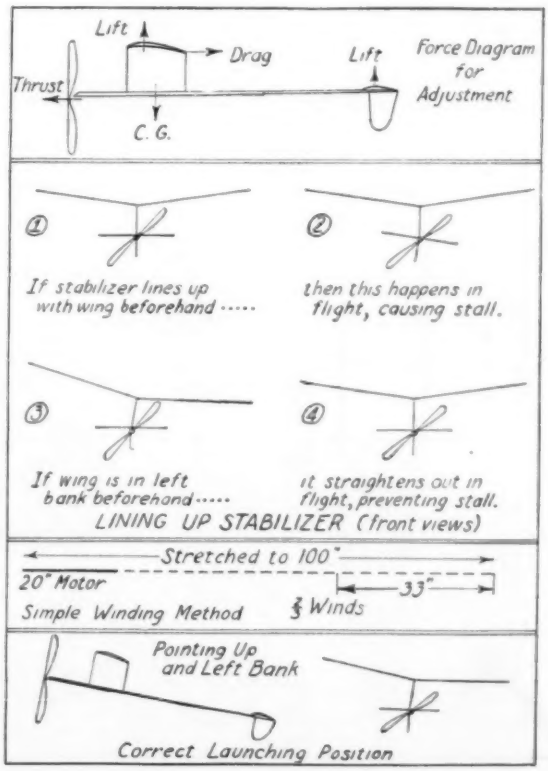
The thrust line should not be offset in any direction. Take a look at the diagram representing this set-up. Here are the reasons for it. The propeller pulls straight ahead. The wing is set at the most efficient lifting angle. However, since the drag of the wing is high above the thrust line (represented by the motor), it will tend to stall the ship. Consequently, we put a little lift on the tail, either by camber or a positive angle of incidence, in order to overcome this stalling tendency.

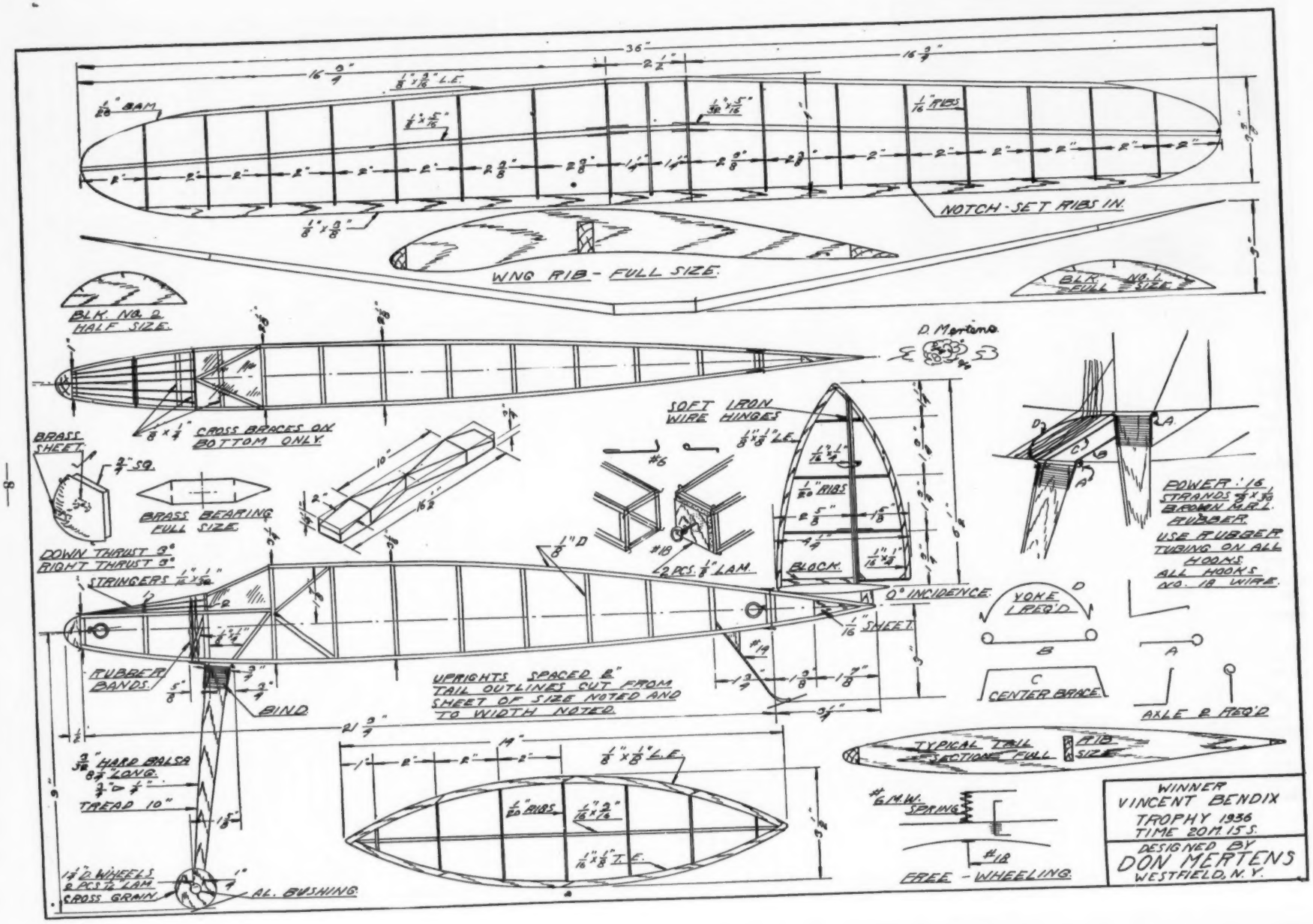
Note, also, that the center of the root chord of the wing is directly above the balance point, known as the center of gravity (C. G.). This is one of the important keys to proper adjustment. In testing out a new ship of fairly conventional design, first set the wing in the position just described—center of root chord above center of gravity. Now wind up the propeller just enough to take out the slack of the motor, and glide the ship. If it stalls or dives, DON'T MOVE THE WING! Warp the stabilizer, instead. In case it dives, warp the stabilizer trailing edge upward; in case of a stall, warp the stabilizer trailing edge downward. And another thing for you to remember—only warp a little at a time, and test it out after each change, watching carefully to note the effects.

Keep this up until the ship glides perfectly, like the effortless flight of a gull. Don't rush things simply because you are in a hurry to wind it up. Work slowly and carefully until you get the glide just right, and you'll have less trouble afterwards. The ship should of course be making a large circle about forty feet in diameter, to the left, which is the accepted manner for indoor models. If the circle is too large, check the offset of the rudder (which should be about 3/16" for tractors and fuselage models); check for too much washin on the left wing; and check *during the glide* to see that the stabilizer is lined up with the wing. If the circle is too small, check the same things as above, except that the excess washin, if any, will be on the right wing instead of the left.

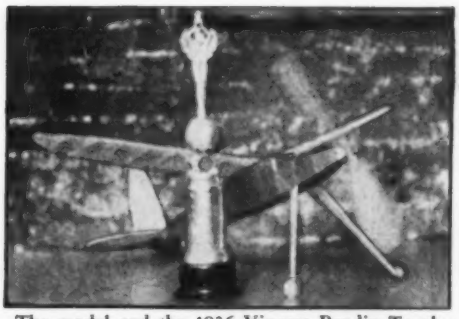
With the circle adjusted to your satisfaction, the ship should be ready to fly. Wind the motor about 500 turns and launch gently into the air, letting the propeller revolve an instant before you let go of the ship. The model will climb very gently, or perhaps just maintain its altitude. Keep an eye out for two things: (1) the wing tips should be level; (2) the stabilizer should remain *level in flight*. Neither the wing nor the stabilizer must bank in flight. Most builders have a lot of stalling trouble because they

(Continued on page 32)




36"
WING RIB - FULL SIZE
NOTCH - SET RIBS IN.
BLK. NO. 2 HALF SIZE
BLK. NO. 1 FULL SIZE
D. Mertens
SOFT IRON WIRE HINGES
CROSS BRACES ON BOTTOM ONLY
BRASS SHEET
BRASS BEARING FULL SIZE
DOWN THRUST 3°
RIGHT THRUST 3°
STRINGERS
RUBBER BANDS
BIND
0° INCIDENCE
UPRIGHTS SPACED 8" TAIL OUTLINES CUT FROM SHEET OF SIZE NOTED AND TO WIDTH NOTED
TREAD 10"
HARD BALSA LONG.
WHEELS
CROSS GRAIN
AL. BUSHING
BLOCK
YOKE REQ'D
CENTER BRACE
AXLE REQ'D
TYPICAL TAIL SECTION FULL SIZE
#6 H.W. SPRING
#18
FREE - WHEELING
POWER: 16 STRANDS OF BROWN M.F.L. RUBBER.
USE RUBBER TUBING ON ALL HOOKS
ALL HOOKS NO. 18 WIRE.
WINNER VINCENT BENDIX TROPHY 1936 TIME 20M 15S.
DESIGNED BY DON MERTENS WESTFIELD, N.Y.

Build This Winner OF THE Bendix Model Trophy



The model and the 1936 Vincent Bendix Trophy which it won

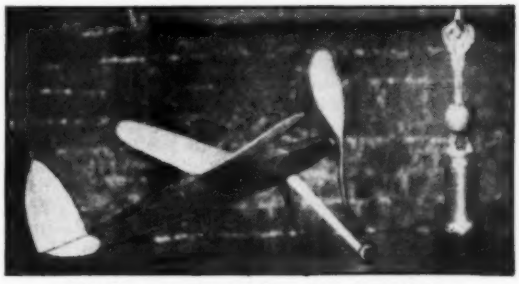
How You Can Create a Fuselage Model That Will Win Contests for You. The Construction Is Simple

By DONALD MERTENS

ON AUGUST 31st, 1936, at the annual Scripps-Howard Junior Air Races, held at Buffalo, New York, this trim model flew for 20 minutes and 15 seconds, topping all flights of the day before going out of sight.

Several days later the model was found about 20 miles from the airport at which the contest was held. A few minor repairs were made on the ship and since then it has been flying as well as ever.

First draw a set of full size drawings. Now for the actual construction of the model. The instructions are very brief due to the fact that the plans are almost self-explanatory.



The "generous" propeller gives long flights

Fuselage

Start by making the two sides of ⅛"x ⅛" balsa, with the ⅛"x¼" heavy braces where shown on the plans. The tail plug is made with the rest of the fuselage and cut off, to a separate piece later. Be sure to put two uprights here. Now join the two sides starting at the tail. Put the bulkheads and stringers in place on the nose. Bend the wire landing gear part B and bind and cement to the correct cross brace. Cut the tail plug loose now and put the rear hook onto it. Also carve the nose plug. Sand the fuselage lightly and cover, then give it two coats of clear dope. Now put on the hooks that hold the plugs in place.

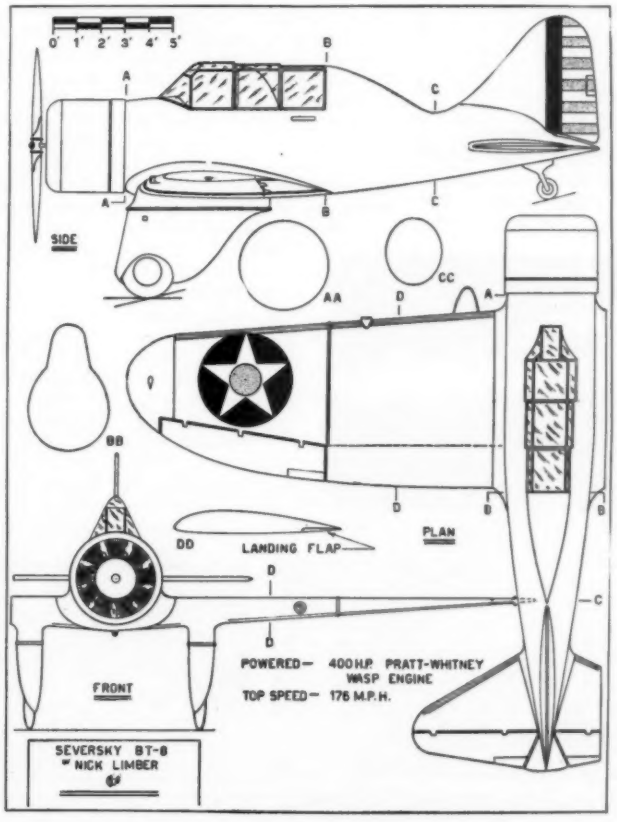
Tail Surfaces

Cut the ribs from 1/20" stock, and assemble as shown on the plans. The outlines are cut from ⅛" stock and $\frac{1}{16}$" stock. Sand and cover the tail surfaces, have the grain running parallel to the ribs. Now assemble the rudder onto the elevator and when dry cement onto the tail plug. Be sure that the elevator is set with no degrees incidence.

Landing Gear

Cut the two struts to the size shown on the plans, from 3/32" stock. Next bend the wire parts. Cement and bind the axles and parts A, C and D onto the struts. While drying, make the wheels from two sheets of 1/16" laminated and put the bearings on them. Fasten the wheels to the axles. Now hook hook A into the loops on the ends of part B, which are on the fuselage, and slide the rubber bands over the fuselage and yoke as shown. To remove the landing gear slide the rubbers forward off the yoke and unhook hooks A from part B.

This landing gear was designed by the Indianapolis fellows, and is the most efficient landing gear I have found. It makes the model practically crash proof. Give four coats of clear dope.



Wing

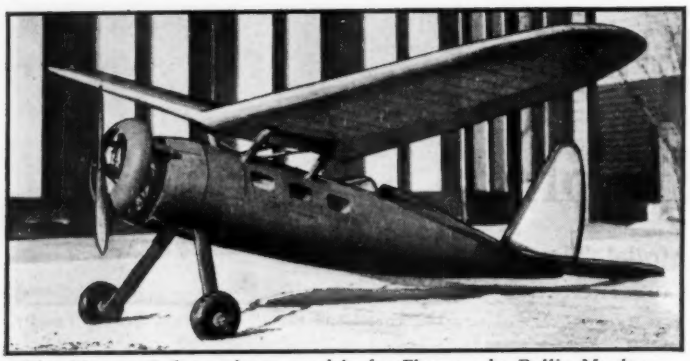
Cut out the correct number of ribs from $\frac{1}{16}$" stock. Pin the leading edge, trailing edge and the spar in place on the plans, and cement the ribs on them in their proper places. Be sure to notch the trailing edge where the ribs join it; this adds much to the strength of the wing. Crack the spar and put the dihedral in the wing. Brace the spar where cracked with music wire or 1/32" sheet on each side of the spar. Sand the wing and cover it. Give it two coats of clear dope.

Propeller

We now come to the most important part of the plane, at least to my mind, the prop. Carve the prop very carefully from a block of the size shown on the plans. Carve it down to about $\frac{1}{16}$" and then sand it down to about $\frac{1}{16}$", using finer grades of sandpaper till you reach No. ten zero. Now give it ten coats of dope, sanding lightly between each coat and polish with the back of the sandpaper after the last coat. Assemble onto the prop shaft and nose plug and assemble the free-wheeling unit. You may use any type of free-wheeling, just so that it is reliable. Make up a motor of sixteen strands of ⅛" by 1/30" brown rubber 21" long and put in the plane.

Mount the wing onto the fuselage and the landing gear onto the fuselage. We are now ready to test fly it. Balance the model by holding the wing tips and slide the fuse-

(Continued on page 26)



Pict. No. 1. A fine scale gas model of a Fleetster, by Rollin Moulton

"Gas Lines"

Latest News of Members of the International Gas Model Airplane Assn. From All Parts of the World

The I.G.M.A.A. Pin

ALL members of the International Gas Model Airplane Association are beginning to look forward to the annual spring I.G.M.A.A. Eastern States Contest, which will be held on May 22nd. This is the third semi-annual contest held under this name. The meet will start at nine o'clock sharp at Hadley Field, New Jersey. This is just four miles south of Dunellen, New Jersey.

It is hoped that contestants from various parts of the east will be on hand so that many units will be represented. Will all unit leaders kindly get in touch with headquarters concerning further details. The rules which will govern the contest appear at the end of "Gas Lines." One of the interesting features of the meet will be the incorporation in the events of flights with timers, the maximum time allowed for engine running being forty-five seconds.

Another important contest, called the Eastern States Gas Model Contest, but not held under the auspices of the I.G.M.A.A., is the one being run off at Elmira, New York, from the 5th to the 9th of July, at the conclusion of the National Soaring Contest. All gas model builders who wish to enter this contest should write to The Soaring Society of America, Inc., 1614 Delaware Avenue, Wilmington, Delaware.

There have been many contributions of interest from the members of the Association this month. Rollin H. Moulton's latest gas model is shown in picture No. 1. Moulton lives at 4519 Lawn Avenue, Western Springs, Illinois. This is an exceptionally fine model, being a Consolidated Flightster. It has a 7½ foot wing span and is powered with a Brown Junior motor. The fuselage is of monocoque design with ten three-ply wood bulkheads of the ring type. There are eight ½" x ⅛" stringers. This frame is covered with 1/16" sheet balsa glued to the stringers and bulkheads. This fuselage is 8¼" in diameter at the largest section.

Here is a hint for landing gear construction which may help many builders. The gear is made of ¼" outside diameter steel tubing which is streamlined. There are springs and rubber bands for taking the shocks and the travel of the wheel is 3½".

The ship weighs 4¼ pounds ready to fly. Moulton says that the first time he tried to fly the temperature was twenty-nine degrees and he had to burn gasoline to get the motor started. After a slight adjustment, which was indicated on the first attempted fligh, it flew beautifully, ending with a perfect landing. Mr. Moulton says this model is of his own design. He deserves a lot of credit for its ingenious construction and excellent aerodynamic and stable qualities. Taken all in all, it is a very fine job.

Picture No. 2 shows Franklin Dewey's model, which he has named the "Jeep". Those who read "Popeye" will be inclined to think that this model flies with its nose down and tail up, which seems to be a characteristic of this peculiar animal. If this attitude of flight is carried to extremes we are sorry for what the ultimate end of this ship must be. However, casting levity aside, this is a very fine job. It was built in May 1935, and it won sixth place at the St. Louis National Contest with a flight of 9 minutes, 17.6 seconds. Its builder says that the ship is notable for its stability and unusual climb. The machine has a six foot, six inch spread and weighs about five pounds powered with a Brown engine. Dewey's address is 21 Roslyn Road, Grosse Pointe Shores, Michigan.

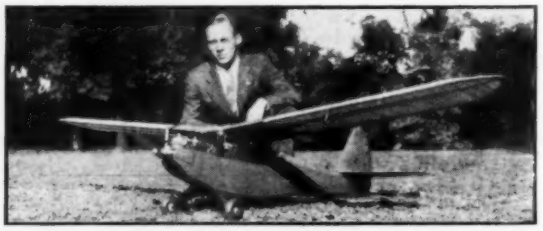
Picture No. 3 shows Bill Effinger's latest model of the Buccaneer type. Bill lives at 53 Berkeley Place, Brooklyn, New York. The ship is well streamlined and extremely neat in all phases of its construction. The aerodynamic set-up is exceptionally good for stability. The clean lines give it efficiency.

Picture No. 4 shows an exceptional example of fine framework construction. It is a scale model of the Curtiss Wright Coupe, built by Rex Hall of 313 Ryan Street, Bellflower, Calif. A Baby Cyclone engine furnishes the power. One of the features of the ship is DeHavilland wing

Pict. No. 2. One of Franklin Dewey's models. We wonder why he calls it "The Jeep". Perhaps it keeps its tail up

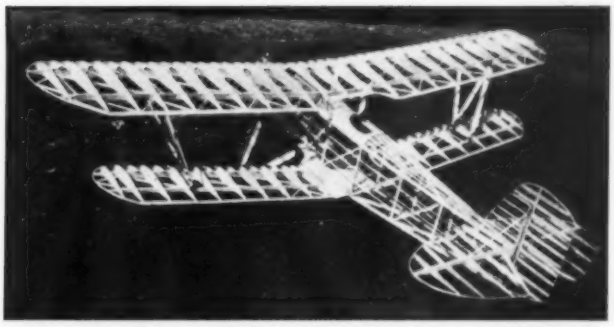
Pict. No. 3. Bill Effinger's latest streamlined Buccaneer, powered with a Brown Jr. motor

Pict. No. 4. A Baby Cyclone powered Curtiss Wright Coupe built by Rex Hall. The construction includes many details



Pict. No. 5. Richard Kispert and his first model. It has flown for 12 min. on four eye droppers of gas

Pict. No. 6. Peter Bowers with his super performer, a Corben Super Ace. It has made 320 flights



Pict. No. 7. The beautifully made completed framework of Fred Hall's biplane gas model. Some job!! We hope it never crashes

slots, which it is hoped will keep it from stalling.

Richard Kispert of 4309 Glenway Avenue, Price Hill, Cincinnati, Ohio, and his model is shown in picture No. 5. He says that this ship is his first gas job. It has flown more than twenty times, the longest flight being twelve minutes on four eye droppers of gas. Kispert has made a very fine job of his ship, considering that he is a novice in this field of aeronautics. He says:

"I can now say I am in favor of the principles you advocate; namely, a high thrust line, low center of lateral area, a high wing or parasol wing type, and an angle of incidence of the wing not more than three degrees relative to the line of thrust."

Kispert has summed up the essential features of design in the correct manner, and those who adhere to this design set-up will not go wrong. The ship has an eight foot span and weighs four pounds, six ounces. Kispert says the ship is a little sluggish. This should not be with this weight of ship. It may, therefore, be assumed that the propeller is such that it does not act efficiently. We suggest that a propeller of sixteen inches diameter with a pitch of six or seven inches be used on this ship. If the right propeller is obtained the difference in the performance will be startling.

One of the large ships which makes an excellent scale gas job is the Corben Super Ace. Picture No. 6 shows Peter Bowers of Los Altos, California, Box 357, with a model of the Corben which he built recently. The construction is exceptionally neat and the faired-in landing gear struts help to lower the center of lateral area to such an extent that the stability is excellent. Bowers tells us that it was lost on its 320th flight. This speaks for the flying qualities of the ship as far as consistency and general performance are concerned. The longest time flight was fifteen minutes. During one morning as many as forty-five flights was made with it.

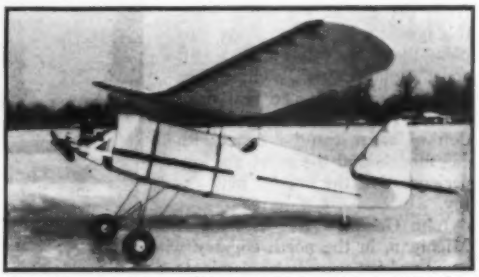
It is evident that Bowers has solved the problem of stability, which is the first problem to be solved in any gas job. Many builders jump over this and strive to obtain efficiency. It is evident that efficiency is useless in a ship so unstable that it will not fly consistently. It is far better to have a stable airplane rather than an efficient one, if both these qualities cannot be embodied in one plane.

The spread of Bowers' ship is six feet and is powered with a Baby Cyclone.

Pict. No. 8. W. S. McKenzie and Irwin Ohlsson with their gas models at a contest held at Santa Barbara, Cal.

Frederick Hall of 1500 West 7th Street, Plainview, Texas, has sent us picture No. 7, which shows us the completed framework of his biplane gas model. He says:

"The first tests with this job after it was covered were not very successful, but after a few alterations it was made to fly. Though it now flies consistently the flights are not of long duration."



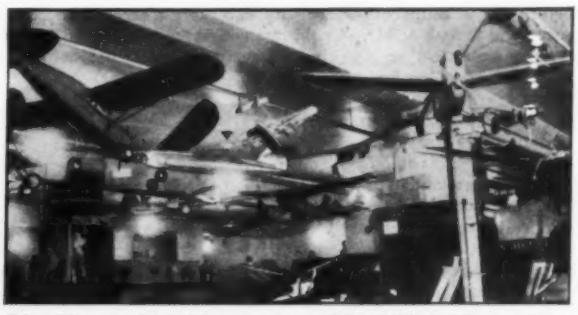
Pict. No. 9. John Giffen appears to be another fan that keeps his model on ice to keep it from spoiling

Though biplanes are not, as a rule, endurance ships they give a most realistic appearance when they are in flight. It is a real thrill to see a biplane gas model go places. This ship weighs six and a quarter pounds. The wheels are home-made from ordinary beach balls purchased at a variety store for only twenty-five cents.

As most gas model fans know, the west coast is "burning up" with activity in gas models. William S. McKenzie, Jr. of 313 West Los Olivos Street, Santa Barbara, California, sends us picture No. 8, which was taken at a contest held at Santa Barbara about a year ago, at which 3500 people witnessed the unusual performance of 75 contesting gas models. In the picture, on the right, is shown Irwin G. Ohlsson, who is familiar to most gas model fans. Mr. McKenzie is shown on the left with his ship.

We wish to comment upon this ship especially. From its general aerodynamic set-up it should be a proficient flier, with low center of lateral area, high thrust line and parasol or high wing. Its builder says that it flies about forty miles per hour. Its take-off speed is twenty-two and land-

Pict. No. 16. A. C. Nissen's second gas job taking off. It has a seven foot span



Pict. No. 12. Unit No. 3's gas model exhibit held recently at Gimbel's store in Pittsburgh, Pa. State Director Bob Allen is pushing things over it seems

Pict. No. 14. The Yakima, Wash., Y.M.C.A. gas model club. (A new unit)

Pict. No. 15. Mr. Yuhasz, sec'y., and the Linden Gas Model Club's first ship

ing speed is eighteen miles per hour. It is notable that the landing speed usually is about 20% less than the take-off speed. The ship weighs 5½ pounds and climbs 350 to 400 feet per minute. It has made over a hundred flights to date. McKenzie uses it as a novelty plane and has it equipped to carry and drop eight torpedo bombs, a three foot parachute and a small six ounce plane. It lays a yellow smoke screen as well, all in the same flight. McKenzie says he is now experimenting with a fifteen foot silk parachute which releases from the top of the wing when the ignition is cut off. At this point the chute opens with a puff and the plane with the chute float gently to earth. It is a real spectacle. This is a good illustration of what can be done with gas models and the sport and experience that the builder may enjoy.

John Griffin writes us from Bitely, Michigan, in the north country where snow and ice seem to predominate, and sends us picture No. 9, which shows his parasol job on the ice on a small lake near his home. Incidentally this type of landing field is excellent for take-offs, provided that no dives occur. The ship has a sixty-six inch wing and weighs only two pounds, twelve ounces complete.

In picture No. 10, shown on page No. 12, we see another gas model builder, Robert C. Gould of Unity Road, Newport, N.H., with his job, taken during winter maneuvers. We wonder if the young men keep their ships "on ice" so that they will last longer without spoiling. The picture was taken just before the take-off on one of its several successful flights. Mr. Gould says that though the weather has been down to twenty degrees he has been able to get his motor running by heating it was a lighted match before he starts it. He says:

"By doing this it only requires a few turns and the propeller will start functioning. After the motor starts it runs as well as in warm weather. In fact, it actually runs better because it does not overheat."

A ship of unusual design is shown in picture No. 11. This was built by Henry Stadelmeier of 132 St. Marks Place, New York City, New York. The large bulge at the front end of the fuselage is incorporated in order to secure the proper fuselage cross section area required by N.A.A. and I.G.M.A.A. contest rules. The weight of the rear part of the fuselage has been cut down to a minimum by building it with a small cross section in the form of a boom.

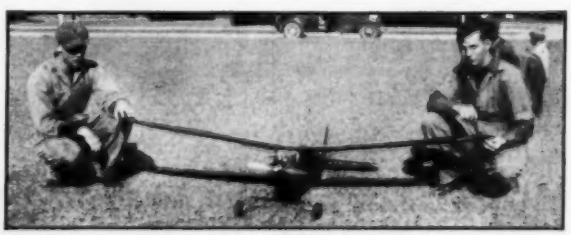
Pict. No. 11. Stadelmeier's gas model built to N.A.A. contest rules but with a boom type fuselage to reduce weight

Pict. No. 10. Robert Gould and his gas job which he flies on the ice of Lake Sunapee, N. H.

A very helpful suggestion comes from R. Haug of 20 South Barrett Avenue, Audubon, New Jersey. He has had trouble with his wing slipping out of adjustment so he hit upon the happy idea of cementing emory cloth to the top of the fuselage longerons and to the undersurface of the wing where it contacts the top of the fuselage, so that the strips of cloth on the fuselage and on the wings line up with each other. Haug says the idea work beautifully and that it has cured the difficulties. The wing may be moved yet enough friction is present to hold it rigidly when in flight.

We hear from Salem Barrack at Zahle, Syria. Most of the old model builders will remember Salem, who is an expert with ornithopters. It seems that he is still keeping up with his model building, though far from America. He writes and says that he believes gas model building and flying is the most fascinating and exciting hobby, as well as being a very instructive one. As he is a very ardent model fan he would like to make a suggestion. It appears that he thinks it is foolish to put a lot of gas in a model and watch it disappear after ten or fifteen minutes of flying. He suggests limiting the supply to ¼ ounce of fuel. "This is only a suggestion however." Salem has probably not heard of the timers now being used on ships which cut off the motor after any desired length of run. It is now a practice in the east to set the timer for forty-five seconds.

Salem says that his glider record in Syria is 37 minutes, 53 seconds. This is the same glider for which plans were published in the November issue of MODEL AIRPLANE NEWS. He says he has a pretty tough time in starting his motor in the slightly rarified atmosphere of 2000 feet. Up to the present time his record is 12 minutes, 47 seconds on only ¼ ounce of fuel. Salem also expresses the hope of being back in America soon and contemplates entering many contests when he arrives.



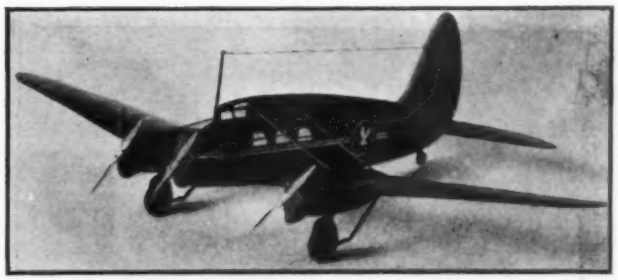
Pict. No. 13. Ray Santee (right) and his helper restrain his Miss America from taking off

Unit News

One of the first I.G.M.A.A. gas model exhibitions was held at Gimbel's Pittsburgh store recently. Some information concerning this was given in the last issue of "Gas Lines." However, we have picture No. 12, which shows some of the models in the exhibit and which may be of in-

(Continued on page 45)

Build This Stinson Glider From Scrapwood



The model, made from scrapwood, ready to fly

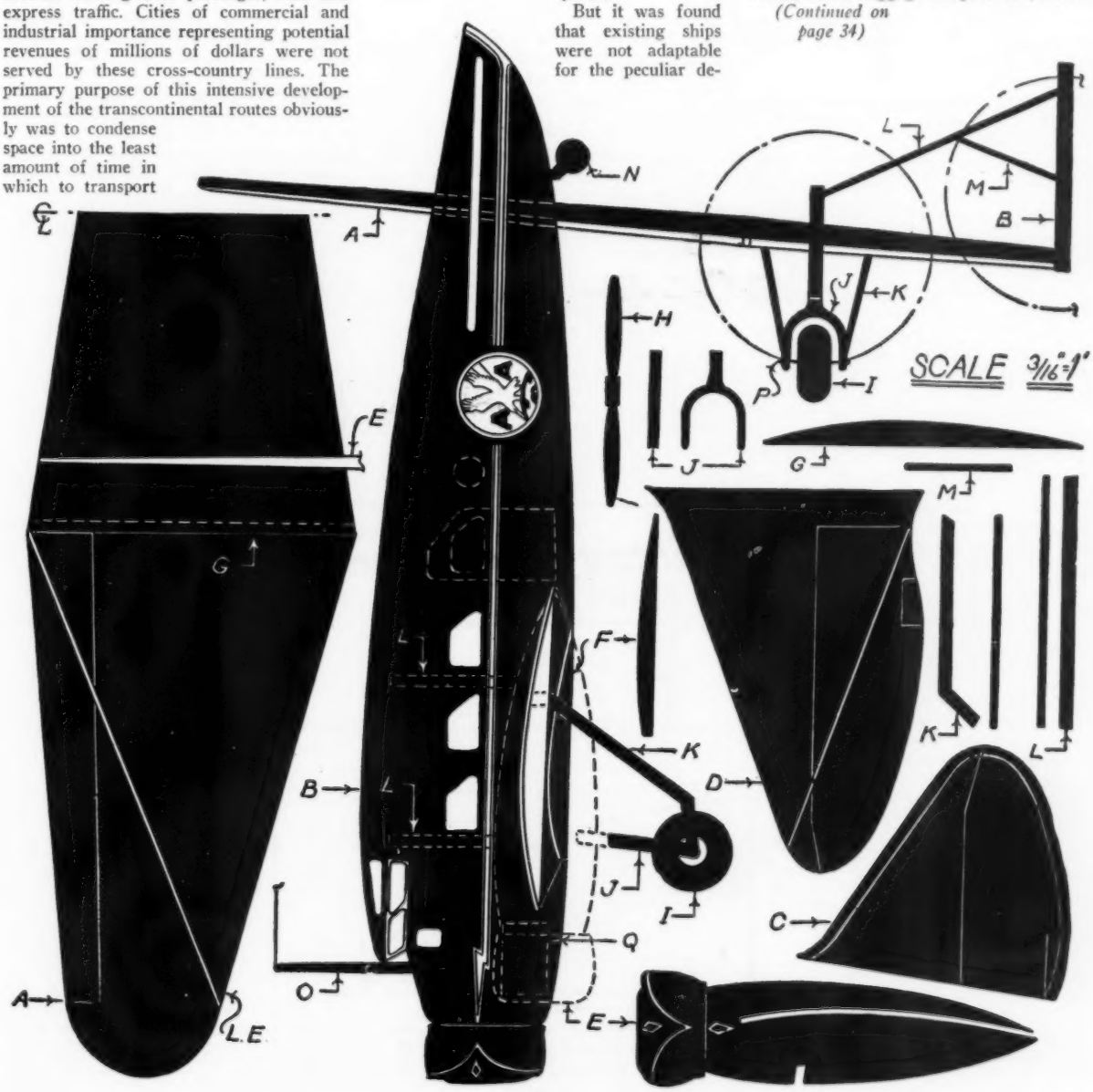
How You Can Make a Realistic Scale Silhouette Model of a Famous Transport That Will Fly

By JESSE DAVIDSON

BEFORE discussing the Stinson Airliner, it is necessary to know the conditions which produced it. Briefly, the development of the main transcontinental routes overshadowed the realization that feeder lines were necessary to keep the main arteries flowing with passenger, mail and express traffic. Cities of commercial and industrial importance representing potential revenues of millions of dollars were not served by these cross-country lines. The primary purpose of this intensive development of the transcontinental routes obviously was to condense space into the least amount of time in which to transport passengers, mail and express. And so the clamor set up by these inland cities stimulated the organization of short-haul lines to tap these cities of their traffic thereby increasing the traffic volume of the main arteries, like tributaries of a great river system.

But it was found that existing ships were not adaptable for the peculiar demands of a short-haul frequent stop line. Speed was the prime essential and economy of operation an equally important factor too. The mechanical development to facilitate the quicker landings and take-offs, loading of passengers, mail and express, volume of the baggage compartment, motors

(Continued on page 34)



The finished streamline gas model ready to go

Building A Streamline Gas Model

How to Build the Motor Mount, Landing Gear, Propeller and Make Final Adjustments

PART 3. By LEO WEISS

THE motor mount is of the removable type, the first of which was designed and applied to gas models by Mr. Charles H. Grant almost four years ago. You will find that the added convenience and strength derived from this mount will more than offset the extra added work in its construction. Care should be taken, however, to include all the mentioned parts, because few are superfluous.

The mount is constructed from ¼" poplar plywood, the same stock used for bulkheads "A" and "B" in the fuselage. The sides may be cut out on a band or jig-saw. Cut the rectangular bulkheads and the strengtheners over the bolt holes from this stock also. Clean up all these parts with light sandpaper just before assembling.

Casein glue and nails are used principally in this construction. Use regular ⅜" nails throughout. Now cut the shear gussets from 1/16" plywood. These are in the form of triangles shown on the motor mount drawing. Use ¼" nails and glue for attaching these. Carefully apply two coats of shellac to the thoroughly dried structure.

Attach Fitting "D" in its proper place on each side of the mount and drill the holes for the motor bolts as marked.

You may now put the motor in place on the motor mount, bolting it in with 1½" 4-36 machine screws. If you use any but the Hurleman motor, it is possible that it will not fit and you will have to do a little job of redesigning. The four stays to hold the gas tank in place below the motor mount are first attached to the holes in the tank flange with ¼" 4-36 machine screws and nuts. Then shove the feed line of the tank into the hole in the venturi, and attach the four stays to the sides of the mount with ¼" wood screws. When the tank is to be removed, it is now necessary only to remove the screws holding it to the stays.

If the Hurleman motor is used, as on the original plane, the problem of mounting the ignition unit inside the structure is simplified many times, since it will fit snugly between the sides. In any other case, cement a piece of 1/16" hard balsa to the mount between the two rear bulkheads for a flooring. Then place the coil and condenser into the box thus formed. No other arrangement is necessary since the coil is bound to fit quite snugly.

Attach all the electrical leads going to the motor according to your usual custom, using a good grade oil-proof wire. The two leads that would ordinarily go to the battery should be soldered to the inside of fitting "D."

This completes the mount for the present, but it would be advisable to rig up a test stand similar to that in the fuselage and iron out any "bugs."

Undercarriage

The undercarriage is of the single strut type, cantilever in construction, with internal shock absorbers. This little unit will give beautiful landing effects, and will possess tremendous strength and shock absorbing qualities when properly constructed and adjusted.

Cut all the metal tubing and rods to the desired size and drill all the shown holes for fitting. Extreme accuracy is required here. While an electric drill or press would be desired, it is not necessary. On the original model a 20c hand drill was used throughout.

Assemble the tubes exactly according to the drawing and solder. Bend the steel axle and solder this to the brass sleeve, using a sweat joint. The sleeve and the axle combination is then soldered to the main strut as shown, again using a sweat joint. Here, it may be a good idea to use a light blow-torch instead of a soldering iron, providing one is available. Next file the hook to shape from 3/16" steel rod, bend as shown, and solder to the curved shock arm, which has already been soldered to the main tube. This arm can be easily shaped with a hammer on a light anvil. Solder on the flange.

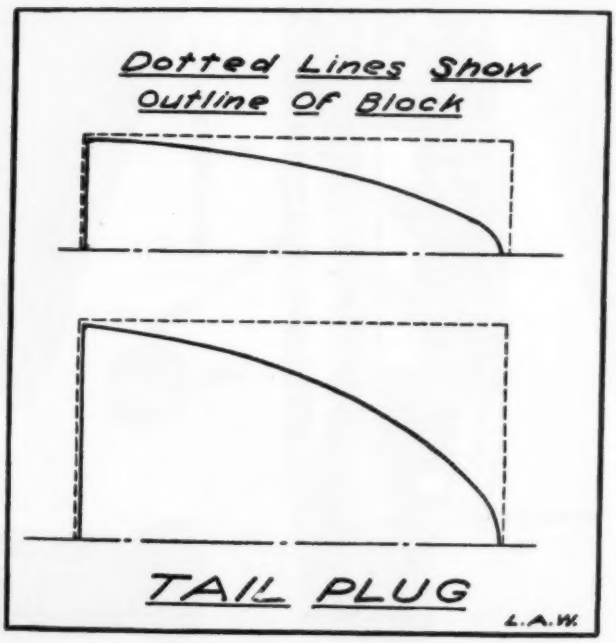
The undercarriage struts (both are made at the same time) are then filleted, each with two balsa blocks, 6⅞" x 1½" x 3/16". These blocks are cemented to the flange, against the main strut. Shape the front of the block so as to conform with this strut. Cut out the rear of the blocks to the shape of the flange and shape them so that they give strut a streamline shape. Sand the wood with fine sandpaper, cover with silk and tape the trailing edge.

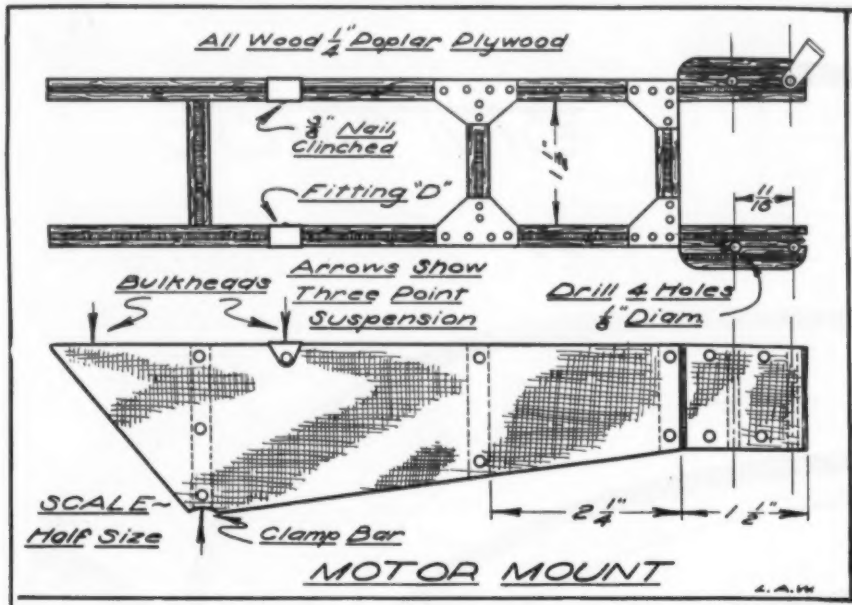
Fuselage Detail

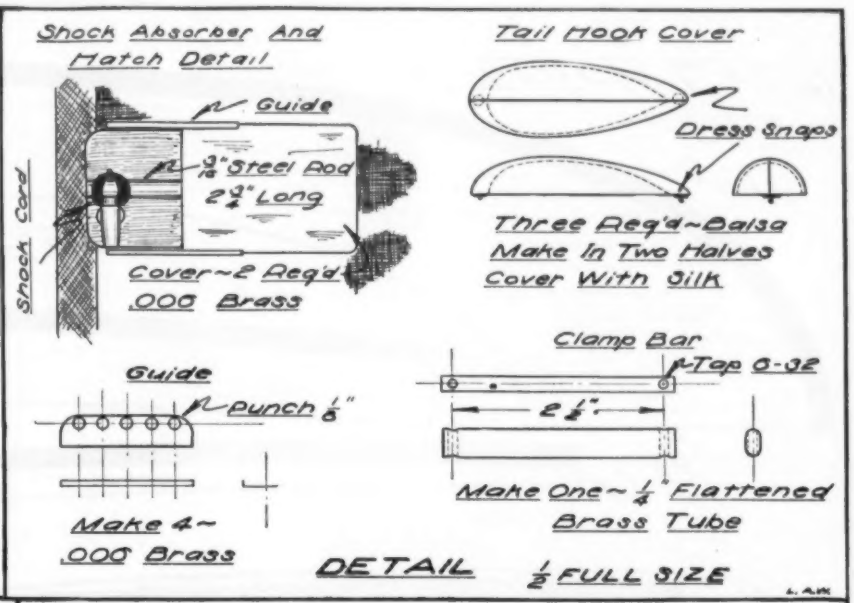
Before cementing the battery contact to the fuselage, solder to the contact plate one end of a piece of insulated wire, and the other end to the front of the left fitting "A." The wire should come through the left hole in the engine bulkhead "A." Cement the contact in place against the skin behind the rear engine bulkhead "B," touching it.

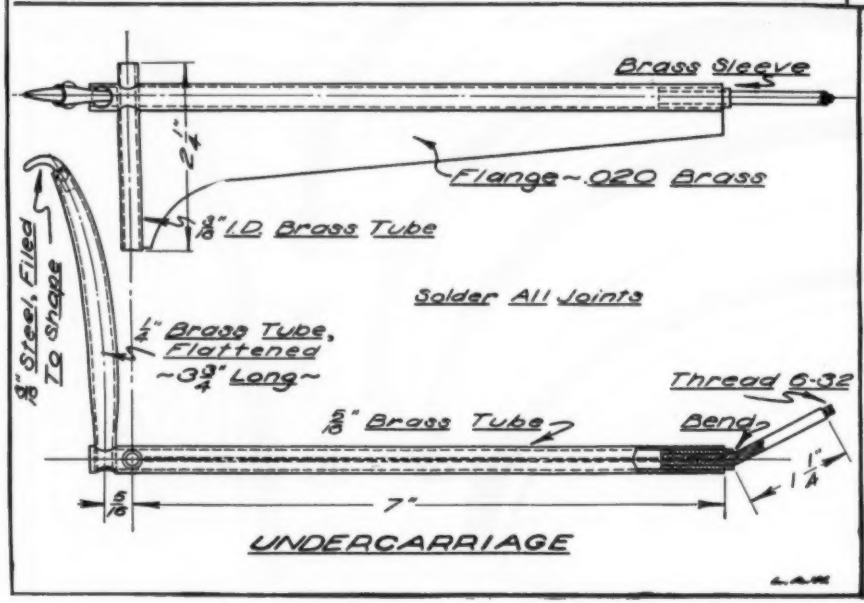
Shape the end of an old flashlight case as shown in the drawing for this detail. From a point about 2" from the cover end of the case, solder a wire 3". Solder the other end of this wire to one of the toggle switch leads. To the other toggle lead solder a wire 8½" long. Run all this, switch first, through the hole for the battery case on the bottom of the fuselage. Attach the battery case in place with two ¼" wood screws into bulkhead "B." Since this is inside the fuselage, you will have to stick a long screw-driver through the undercarriage holes to get at these screws. Working from the inside, shove the toggle switch through its hole in the bottom of the fuselage and hold it in place with the regular nut provided with the switch. The free end coming from the switch is to be attached to the right fitting "A."

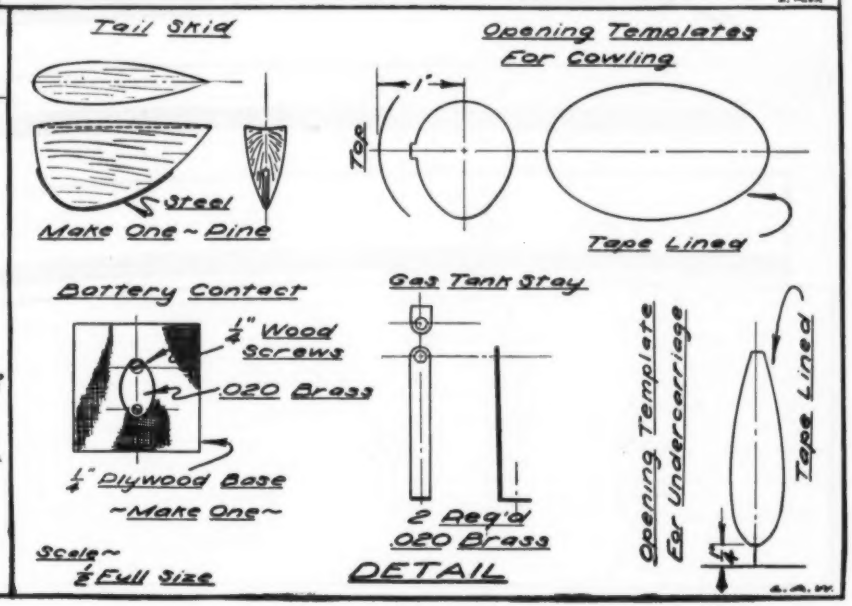
(Continued on page 27)

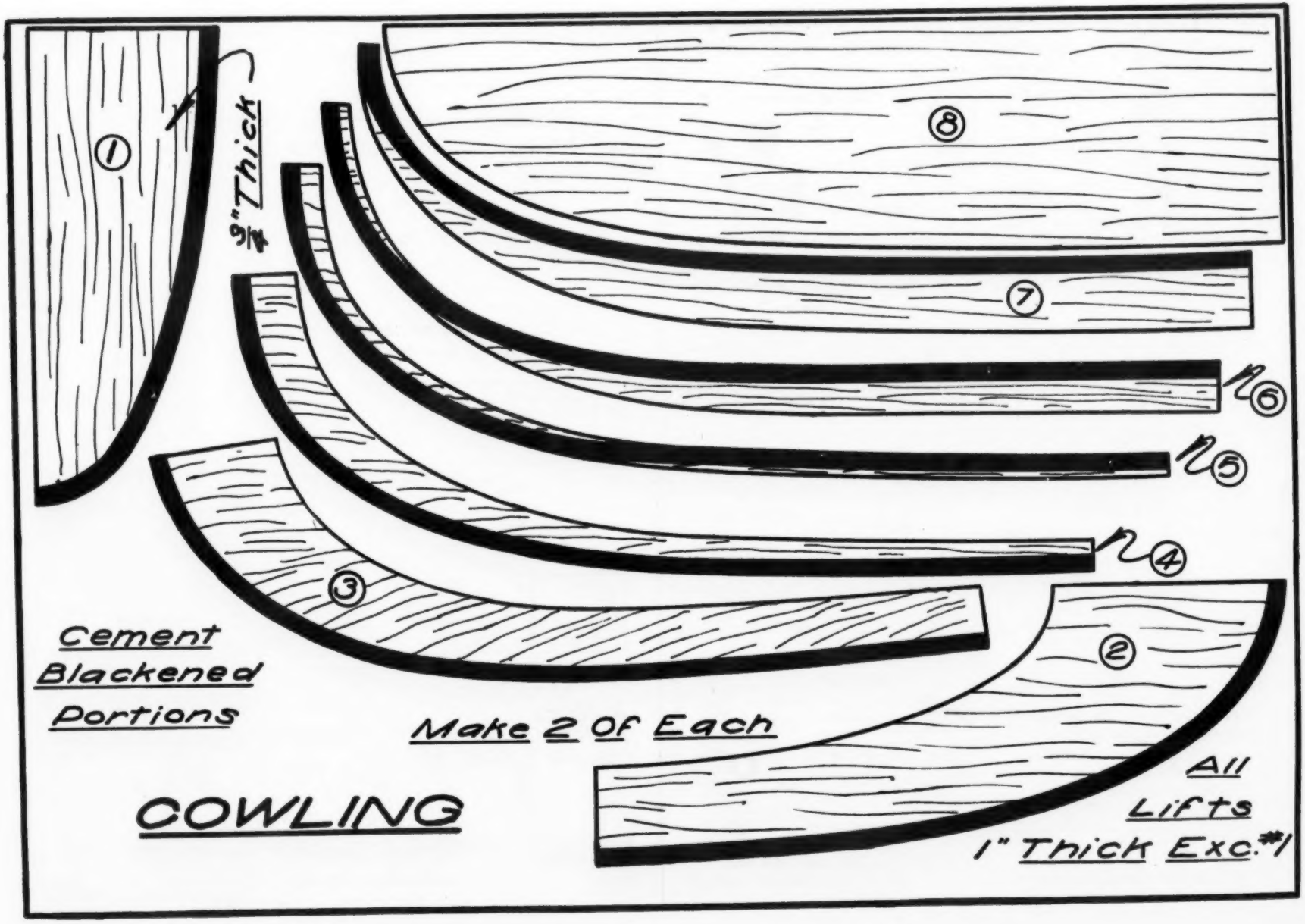



All Wood 1/4" Poplar Plywood
3/8" Nail Clinched
Fitting "D"
1 1/4"
11/16"
Bulkheads
Arrows Show Three Point Suspension
Drill 4 Holes 1/8" Diam.
SCALE~ Half Size
Clamp Bar
2 1/4"
1 1/2"
MOTOR MOUNT
L.A.W.


Shock Absorber And Hatch Detail
Guide
3/16" Steel Rod 2 3/4" Long
Shock Cord
Cover~2 Req'd .000 Brass
Guide
Punch 1/8"
Make 4~ .000 Brass
Tail Hook Cover
Dress Snags
Three Req'd~Balsa
Make In Two Halves
Cover With Silk
Clamp Bar
4-Tap 6-32
2 1/4"
Make One~1/4" Flattened Brass Tube
DETAIL 1/2 FULL SIZE
L.A.W.


Brass Sleeve
2 1/4"
Flange~.020 Brass
3/16" I.D. Brass Tube
Solder All Joints
1/8" Steel, Filed To Shape
1/2" Brass Tube, Flattened ~3 3/4" Long~
Thread 6-32
Bend
5/16" Brass Tube
1 1/4"
5/16
7"
UNDERCARRIAGE
L.A.W.


Tail Skid
Steel
Make One~Pine
Opening Templates For Cowling
1"
Top
Tape Lined
Battery Contact
1/4" Wood Screws
.020 Brass
1/4" Plywood Base ~Make One~
Gas Tank Stay
2 Req'd .020 Brass
Opening Template For Undercarriage
Tape Lined
Scale~ 1/2 Full Size
DETAIL
L.A.W.


1
3/4" Thick
8
7
6
5
4
3
2
Cement Blackened Portions
Make 2 Of Each
All Lifts 1" Thick Exc. #1
COWLING

Designing Your Model for Distance

How the Twin Tractor Rates As a Distance Model and What the Proportions of Your Twin Pusher Model Should Be

Article No. 62 — By CHARLES HAMPSON GRANT — Chapter No. 5

IN THE preceding article of this series, published in the April issue of MODEL AIRPLANE NEWS, the qualities required of a distance model were enumerated. Careful consideration also was given to the suitability of the single propeller tractor and the twin pusher as distance fliers. However, another important type of model plane exists which should be examined in the light of its adaptibility to distance flights. It is the *twin tractor*.

The Twin Tractor

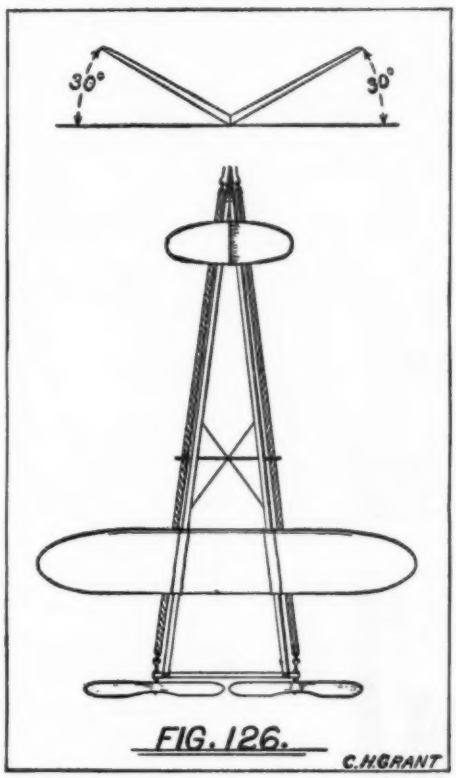
This type of ship has a combination of the virtues and faults of the two other types, the "single" tractor and the "twin" pusher. Let us see what they are and what effect they have.

First of all, will the twin tractor fly straight? It is obvious that the torque of the twin propellers, turning in opposite directions, will be balanced and will create no turning effect. However, if the plane should be turned aside from its normal straight flight path will it be forced to seek its normal course again as the twin pusher does? It will have less tendency to do so unless it possesses certain features of design, but on the other hand the gyroscopic effect of the twin "props" tend to *keep* the plane on a straight course. This cannot be depended upon entirely, however, to accomplish the desired effect because the corrective effect generally is quite moderate.

A very "straight flying" twin tractor may be produced if large tip dihedral is incorporated in the front wing as well as a normal dihedral of seven degrees on each half wing. The dihedral angle of each tip should be about thirty-five degrees to the horizontal, and the length of each dihedralled tip should equal about 12% of the total wing span.

This is only one means of insuring a straight flight. In conjunction with this the fin area should be as small as possible; in most cases about 12% of the wing area. As in the case of the speed model, the fin area should be *just* large enough to prevent spinning. If these two characteristics of design are incorporated in the twin tractor it should have unusual straight flying qualities, though these qualities probably will not be quite as evident as in the case of twin pushers with large dihedral on the front wing. The twin tractor will run a close second in this respect however.

The efficiency or lift to drag ratio of the twin tractor, as a rule, will not be as great or at least any better than the twin pusher, because the twin tractor must possess a landing gear. This should be heavy enough to weight the nose of the model so the wings may be placed (over the C.G.) at a point about two-thirds of the total length of the model from the tail. The landing gear also causes some drag which in turn absorbs power that cannot be applied for flight.



The twin tractor excels on the glide, as all tractor types possess, as a rule, superior gliding qualities than "pushers."

Comparing the twin tractor with the twin pusher in brief terms we can say that: 1. The flight efficiency of the two is about equal. Possibly the twin pusher has a slight advantage. 2. The twin pusher will be able to fly straighter than the twin tractor. 3. The twin tractor will glide straighter and at a "flatter" angle than the twin pusher.

After weighing the foregoing facts, the twin pusher type appears to have a slight advantage over other types, so it has been selected as most suitable for the distance model.

Designing the Distance Plane

Now it is the problem of the designer to lay out the proportions of the model and its parts so that it will fulfill the requirements of a distance plane to the highest degree. Summarizing the general requirements, they are:

1. A straight flight; 2. Long power (propeller) duration; 3. Low total drag or in other words a high lift to drag ratio; 4. A slow propeller tip speed *relative* to the plane's flight speed, but straight flying factors should not be sacrificed to get it; 5. A straight flat glide after the power has been spent; 6. Stability to a high degree in order to conserve power and fly straight.

Frame

When designing tractor models the wing span is taken as the basic feature of design. However, such is not the case in laying out the proportions of a "distance pusher." Here the fundamental element, to which everything is proportional, is the length of the frame, because the area and span of the wing is based on the *length* of the frame or body of the model. There are no wing loading (ounce per square foot of wing area) specifications for distance models. Therefore, this is the first structural characteristic that must be designed.

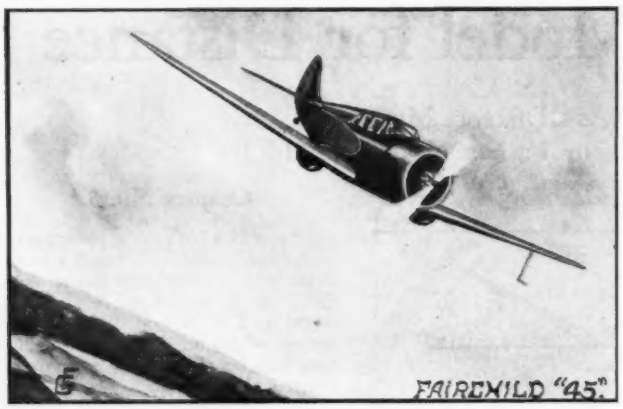
The frame length of the average distance plane is from thirty-six inches to forty inches. Suppose we select a length of thirty-six inches for our ship. The best type of body or frame for twin pushers has proved to be the "vee" frame. This is formed by two main longerons, joined at the front end and spread apart at the rear. The distance between the ends of the frame longerons at the rear should be great enough to allow a slight clearance between the propellers when their bearings are mounted on the rear end of the frame longerons. This distance depends upon the diameter of the propellers. If the propellers are ten inches in diameter, a spread of ten inches is advisable.

It is a requisite of our distance plane that its drag is low. Therefore, the longerons of the frame should have a streamline or oval cross section. A good size for the longeron cross section is half inch wide by a quarter inch deep. As we are concerned with the aerodynamic design of the model here and not with structural details, it is sufficient to say that the two frame sticks should be rigidly braced together.

Wings—Span

The next factor to consider is the wing. In order to satisfy the first requirement of the distance plane; i.e., a straight flight, the span of the wings must not be excessive. If the span of the main or rear wing is large each air gust striking the wing tips will have a large leverage to turn the plane from its true course. Therefore, the smaller the span can be made and still have the wing act efficiently, the straighter the plane will fly. An average value for the span on this type of model is 75% of the length of the frame. As the frame is thirty-six

(Continued on page 40)



Drawn by
F. Gutmann

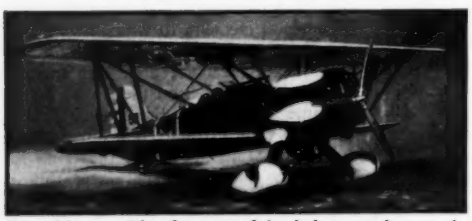
AIR WAYS

HERE AND THERE

What Readers Are Doing to Increase Their Knowledge of Aviation in All Parts of the World. Tell Others What You Are Doing

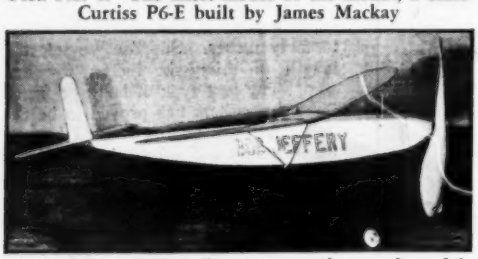
The Air Ways Trophy

AIR WAYS Club members are due for a very pleasant surprise. Sometime ago it was mentioned in "Air Ways" that a duration trophy would be given for the special benefit of Air Ways Club members. We take the greatest pleasure in announcing that this trophy has been officially established. It is to be called the MODEL AIRPLANE NEWS AIR WAYS TROPHY and will be given to the Air Ways Club member who makes the greatest duration with any type of rubber powered model, under National Aeronautic Association weight rule specifications.



Pict. No. 1. The finest model of the month, a scale Curtiss P6-E built by James Mackay

There will be no restrictions as to size or model type. At present the N.A.A. specifications for wing loading is that the model shall weigh one ounce for every fifty square inches of wing area. If, at any time, this specification is changed by the National Aeronautic Association the rule in respect to the Air Ways Trophy will also change.



Pict. No. 2. Bob Jeffery's 62 m.p.h. speed model. One of the country's fastest models

The first chance that Air Ways Club members will have to compete for this trophy will be at the 1937 Nationals. The boy making the longest duration flight at this contest will win the trophy. He will hold the trophy until another Air Ways Club member makes an official flight of greater duration, which flight must be made at any competition sponsored by the Air Ways Club and the National Aeronautic Association. The trophy will then be passed on to the new winner or record holder.

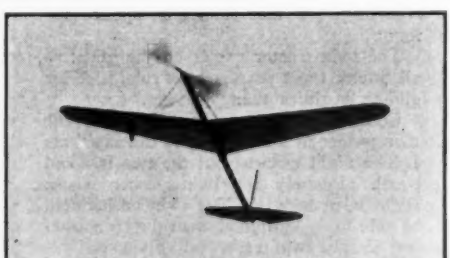
This will be in effect an international trophy for there are Air Ways Club members in all parts of the world. Possibly it will lead to considerable rivalry among such countries as England, Australia, New Zealand and the United States. At any rate, it is about time that club members put on their thinking caps and get busy incorporating their latest ideas into duration fliers. In order to compete for the trophy, members should prepare now to make their trip to the Nationals. We wonder just what type of machine will win the contest. Members will probably have their own ideas concerning this and perhaps we may learn some interesting facts concerning the qualifications of different types of models for duration. The winning model will be published in MODEL AIRPLANE NEWS.

Now for a little news concerning the activities of members during the past month.

We are indebted to Felix Gutmann of 710 West 79th Street, New York City, for our heading, which shows a Fairchild "45" sweeping down over a hillside. Having first hand information concerning Mr. Gutman's work, we wish to say that he is one of the coming young aviation artists.

James Mackay of Headquarter Squadron, Aircraft One, Brown Field, Quantico, Virginia, is the honor contributor this month. Picture No. 1, which he has sent to us, shows his detail scale Curtiss P6-E. This is one of the most remarkable pieces of work that we have seen. No details have been left to the imagination. The model is made to a ¼" scale. Possibly some readers may notice that there is no belly

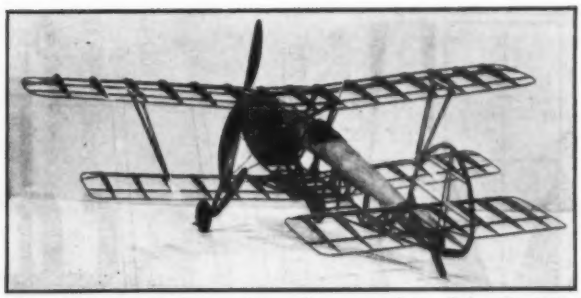
Pict. No. 3. A real action "shot". Knorowski launching a contest ship



Pict. No. 8. Aldo Favilla's model in full flight, winner of the 1936 Italian "Nationals"

Pict. No. 4. Three 8 inch scale models of fine detail, by Henry Clark

Pict. No. 12. Two model fans of South Africa try out part of their "fleet"



Pict. No. 11. A clever piece of construction. John Pearce's biplane "Fantom"

tank. Mr. Mackay tells us that it was removed when the picture was taken. To show the completeness of detail there is even a model tool box on this plane with tools, as well as a shock absorbing landing gear and real steel flying and landing wires. It appears that the "Marines have done it again."

Many fellows have never seen a real speed job that has turned in good time consistently. Picture No. 2 shows Bob Jeffery's ship, which has made a speed of sixty-two miles per hour. Jeffery is a member of the Findlay Model Aviation Club of 448 Center Avenue, Findlay, Ohio, and we are indebted to Mr. A. B. Fruchey for this information. Mr. Fruchey remarks in his letter:

"All of our ships are of original design. In contests we use a launching platform seven inches high. Ships must be off the ground at the starting line and must fly over the finish line. We always fly either a 176 or 200 foot course. We let the tail boom come loose when the power is exhausted so the ship will get down in one piece. This is a sloppy way to land but effective."

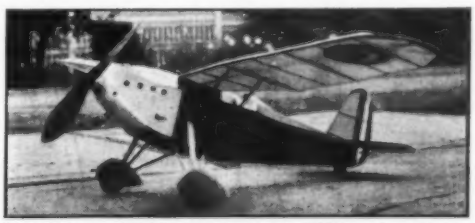
Several hints are given in respect to speed model design. Mr. Fruchey says that they have found that heavy wing loadings have not proved to be as successful as very light wing loadings. In other words, the ship must be light but the airfoil very flat or streamlined. The area of the wing should not be cut down to a very low value. If the model is heavy and the wing area small the ship has difficulty in getting off the ground, and when it lands —well, those of you with an imagination can picture what happens when the model is travelling at sixty miles per hour.

Frank Knorowski of 24 Engle Street, Glen Lyon, Pa., has been kind enough to send us a very good picture of his model taking off, picture No. 3. He is shown in the background with the model flying toward the camera. There is plenty of action here. Readers interested in design will notice a very peculiar thing about the model in flight. It leans to the left (left wing low) and the nose points to the right. A keen aviation detective might say something like this concerning these facts:

"The attitude is due to the torque reaction and gyroscopic effect of the propeller." This phenomena affects the plane's flight position because it has not yet, as shown in the picture, gained full flight speed. Thus the torque reaction causes it to bank to the left and the gyroscopic reaction noses it to the right. Readers who have flown models to any extent will be acquainted with this peculiarity of single propeller models before they have gained full headway.

It appears that Henry Clark of 46 Fort Washington Avenue, New York City, has a very fine collection of photographs, as this is his hobby. Among these is one which he sends us, picture No. 4, which shows three models built by Paul

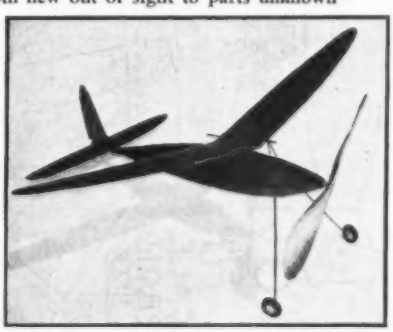
(Continued on page 26)



Pict. No. 5. A flying scale Polish Fighter, by Joseph Wherry. It's a fine flier

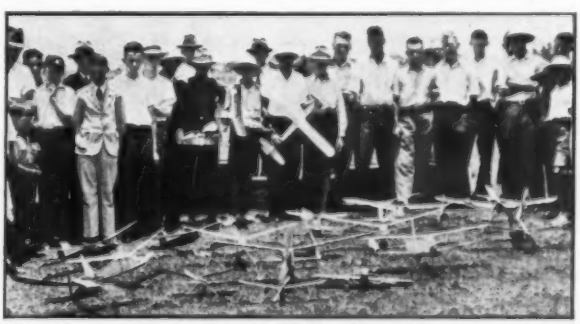
Pict. No. 7. Bob Chatelain's and Bob Jeffery's models. They both flew out of sight to parts unknown

Pict. No. 6. Stephen Kowalik and his 6 ft. Dupont Albatross II model

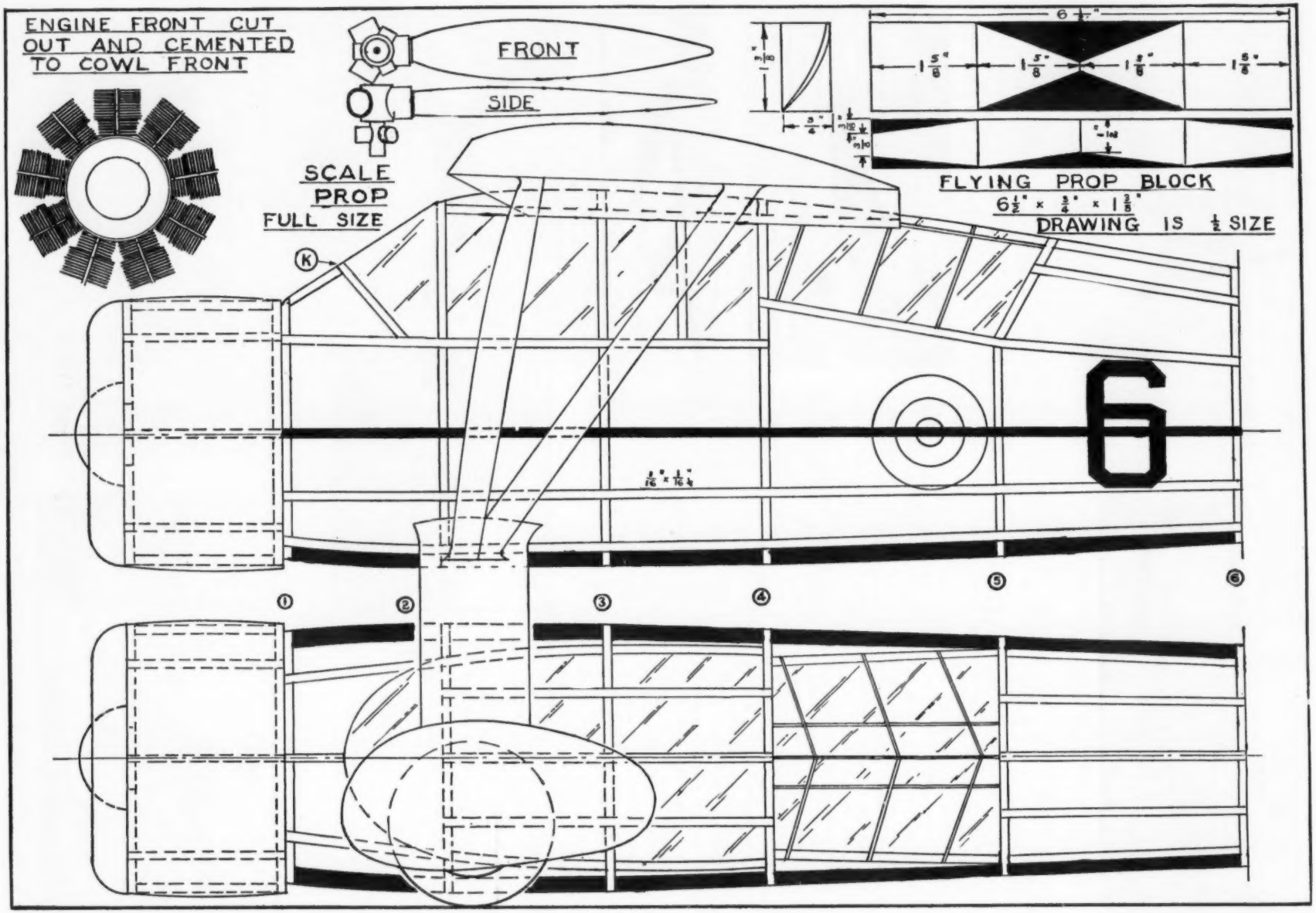


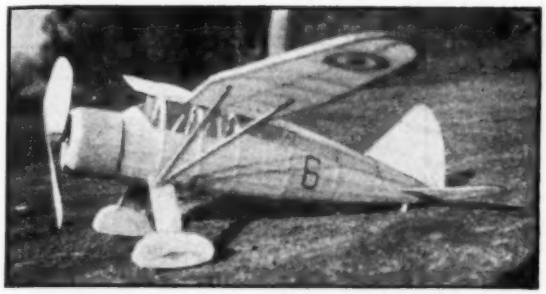
Pict. No. 13. One of W. B. Macklay's duration fuselage models, a beautiful job

Pict. No. 9. An overgrown glider of 10 ft. span built by Alfred Van Wymersch



Pict. No. 10. Model fliers at the Bundabery-Maryborough contest, held in Queensland, Australia


ENGINE FRONT CUT OUT AND CEMENTED TO COWL FRONT
FRONT
SIDE
SCALE PROP FULL SIZE
FLYING PROP BLOCK
6½" × ¾" × 1⅝"
DRAWING IS ½ SIZE
6
K
1
2
3
4
5
6



The finished model is just like its big brother

Realistic yet stable because of the high wing

Build and Fly the Westland Cooperation Plane

By ROBERT HARRISON

How You Can Create a Real Miniature of a New British Fighter With Unusual Flying Qualities

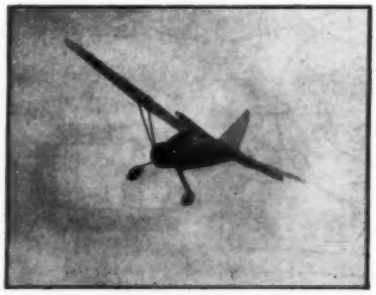
THIS Westland A39/34 is probably the fastest and the most useful Army Cooperation machine that the British R.A.F. has ever possessed. It is equipped with Handley Page slots and flaps to enable it to get into and out of small fields such as the type of small front line landing ground encountered during wartime conditions. It carries two-way radio communication; is equipped for picking up messages from the ground while flying and has photography apparatus in addition to carrying a fuel supply great enough for a six hour flight.

The Westland A39/34 as it is temporarily designated, has a span of 50 feet and a length of 30 feet. It is powered at present with a poppet-valve Bristol Mercury engine of 600 hp. This engine is being changed in the production A39/34 to a new sleeve-valve Bristol Perseus 825 hp. engine. It has an automatic controllable pitch 3-bladed prop. The plane itself is constructed entirely of metal with fabric-covered wings and fuselage. The tail units are covered with light metal alloy sheeting. The cockpits are situated so that the pilot and his gunner have the maximum amount of vision at all times and at the same time are in direct communication with one another. The pilot is seated exceptionally high up in front of the observer. Both cockpits are heated for high altitude flying. The landing gear is of the single strut type and the wheels are covered with a peculiarly-shaped pant.

The flyability of the model is quite good due to the gull-shaped wings and the lightness of the construction. The model as described here has flown for a half a minute but when the "extras" such as the insignia heavy dope, etc., are left off the model and the construction is lightened, then the plane is good for flights of over a minute and is recommended for flying scale model contests. Now let us get to work (or pleasure I should say) building one of England's premier fighting planes.

Fuselage

The fuselage formers are all cut from a sheet of 1/16" x 2¼" balsa. The keel pieces are cut from a sheet of 1/16" sheet balsa likewise. The keel pieces are shown on the plan in heavy print. The stringers are 1/16" sq. balsa. The first thing to do is to cut out the keel pieces and the formers from the sheet balsa and then cement the formers in their proper places on the bottom and the two side keel pieces. In this manner the fuselage cannot twist out of shape very readily while the rest of the stringers, 1/16" sq. are being applied. The windows of the plane are covered with non-waterproof cellophane. When the rest of the model has been finished and papered and the water is applied to shrink the paper, the cellophane will also tighten up and give a much neater appearance than if the waterproof variety had been used. The cowl is made in a manner similar to the fuselage and the dummy engine front on the plans can be cut out as can the instrument board and glued into place. The nose block is made from a piece of hard wood (pine) or hard balsa, and is made removable. The tail plug is also removable and is carved from a balsa block 1⅝" x 1" x 1". The landing gear struts are constructed of ⅛" thick sheet balsa and slipped into the slot provided for them in former number 2. The pants are built up in the usual manner from ⅛" sheet balsa. It is best to set the fuselage aside now and leave it to be covered with the rest of the parts.



The model in actual free flight

The model getting under way just after the take-off

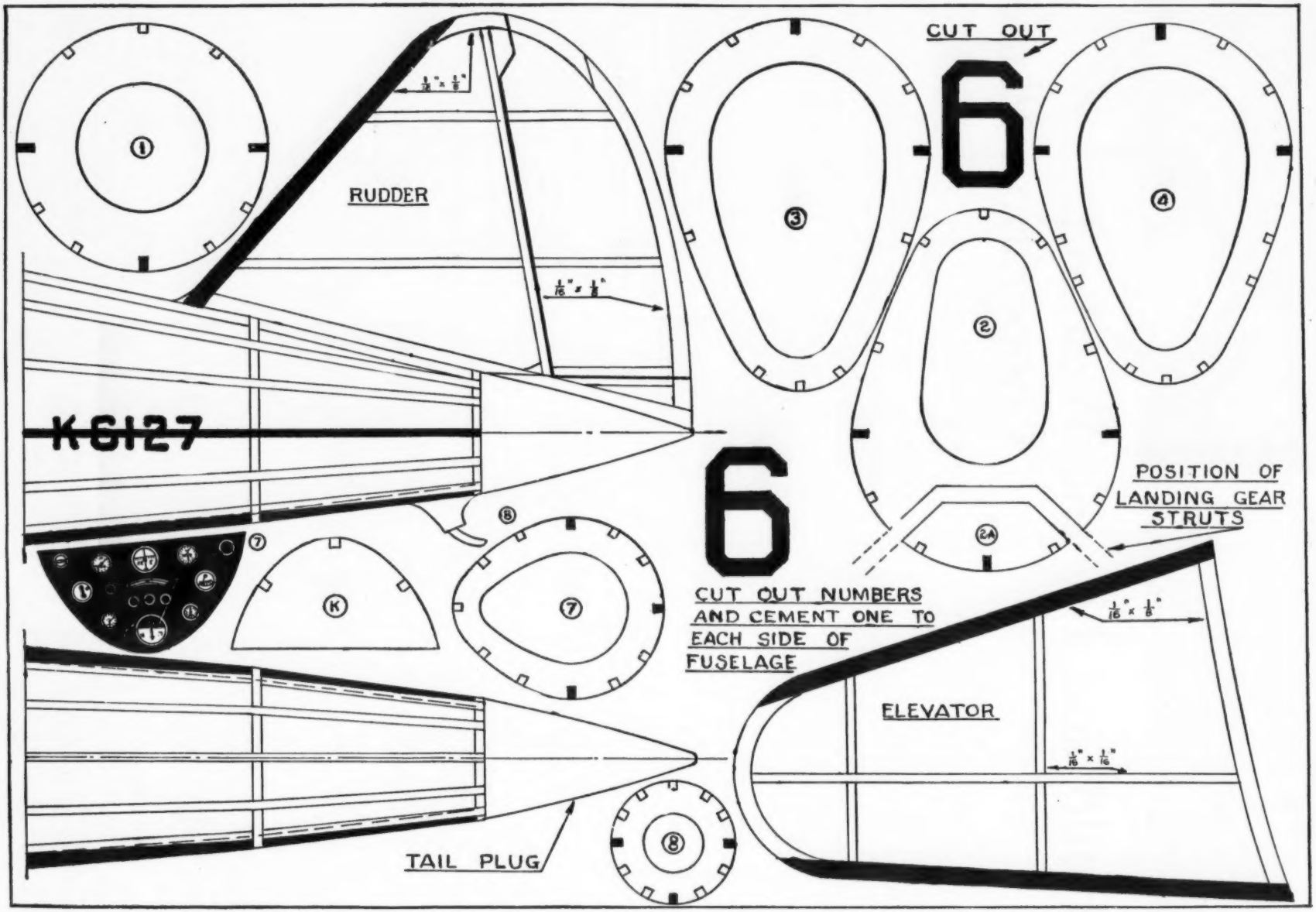
Tail Surfaces

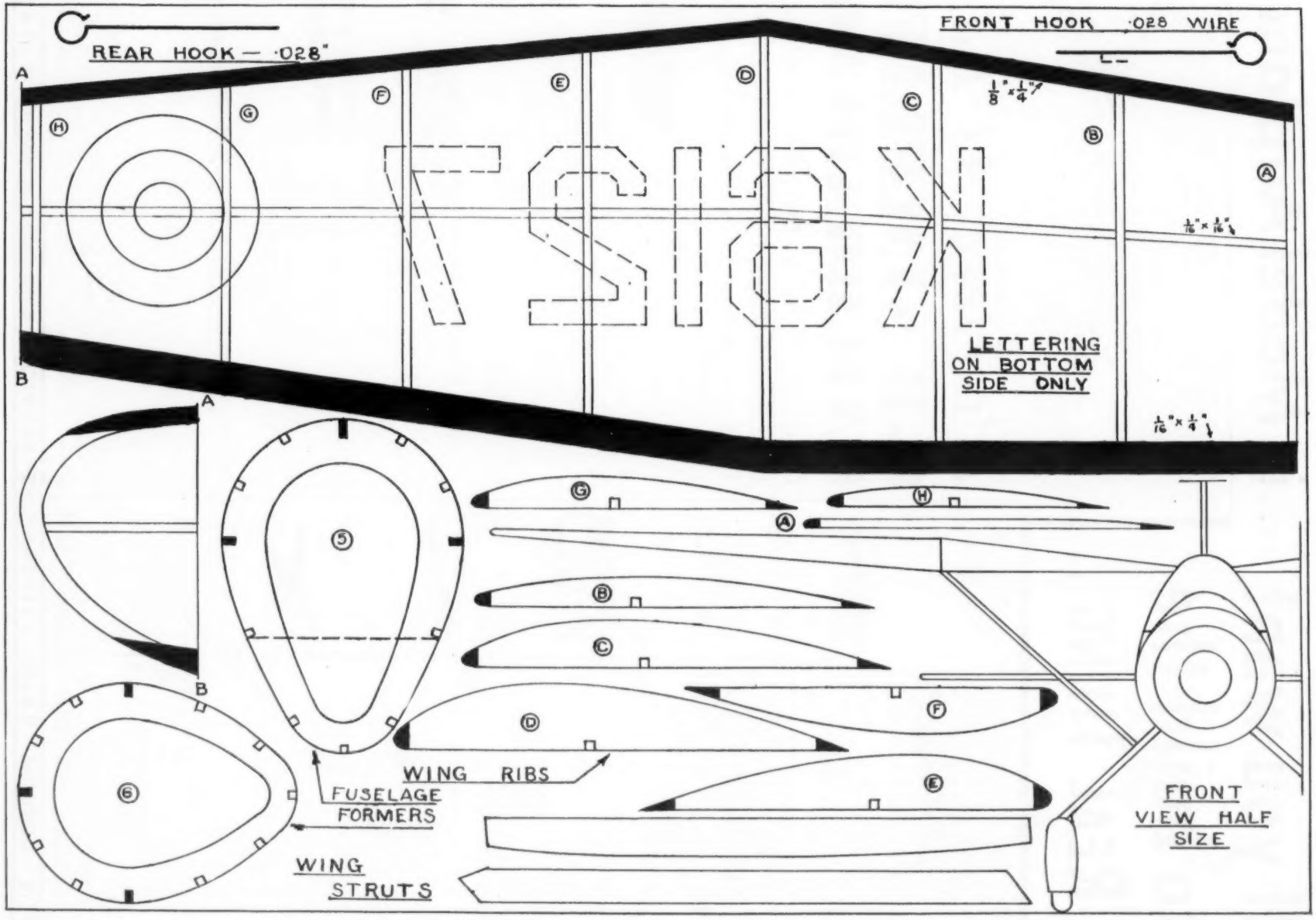
The tail surfaces are made by first covering the plans with a sheet of waxed paper and then outlining the drawing with small pins. The outlined pieces are cut from 1/16" sheet wood and are ⅛" wide. The center reenforcing pieces are 1/16" sq. balsa. When making the elevators it will be necessary to redraw the elevator in order to make the right half.

Wings

Before commencing construction of the wings, it will also be necessary to redraw the right half of the wing as space did not permit it to be given in the plans. The leading edge piece ⅛" x ¼" balsa is pinned in place after the plans have been covered with waxed paper and then the trailing edge is likewise pinned in place. The center spar is a piece of balsa 1/16" sq. The wing ribs are all drawn full-size and are made from a piece of 1/16" sheet balsa. Make two of each rib size. Cement the ribs into position and allow the wing to dry thoroughly. While the ribs are drying the wing tip pieces can be carved from a piece of 1/16" sheet balsa and are ⅛" thick or wide. These can be set into position without disturbing the wing. When the wing has dried, proceed to cover the plane.

(Continued on page 39)

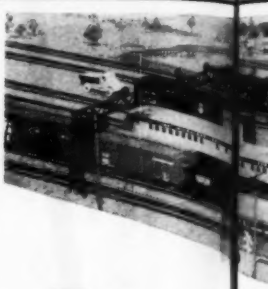

CUT OUT
6
RUDDER
K6127
6
POSITION OF LANDING GEAR STRUTS
CUT OUT NUMBERS AND CEMENT ONE TO EACH SIDE OF FUSELAGE
ELEVATOR
TAIL PLUG

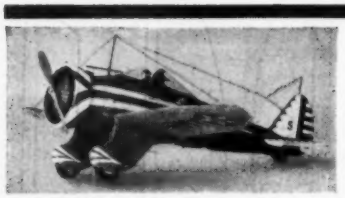

REAR HOOK — ·028"
FRONT HOOK ·028 WIRE
A
B
H
G
F
E
D
C
B
A
1/8" x 1/4"
1/16" x 1/16"
1/16" x 1/4"
LETTERING ON BOTTOM SIDE ONLY
A
B
5
6
WING RIBS
FUSELAGE FORMERS
WING STRUTS
FRONT VIEW HALF SIZE

If you want to build the "REAL THING"..

...in Model Airplanes,

The photo at the right shows the Valley City Station on the Tippecanoe, Tuckahoe and Tehachapi line (T. T. & T. to you) the line on which all trains run, subsidiary of the great 3/16" scale C-D lines with the Rep Hiawatha Streamliner thundering through, as Valley City is not a stop station for it, the tail end of a Pennsylvania freight pulling through, a Chesapeake and Ohio Pacific type, the Locomotive that draws the famous "George Washington" train, lazily cruising after a run, down to the roundhouse, the Pennsylvania Switcher with several cars having just left the scene, being somewhat isolated, it was eliminated from the above layout.





New C-D P26-A Fighter

Model is dazzling with its yellow wings, blue fuselage and gorgeous red and white scallops and stripes. Radio antennae adds unusual smartness. High speed flyer. Span 21". (Dry Kit SF-60, complete except no liquids, only..... **$2.65**

AERONCA C-3 SPORT

Easy for beginners, span 27". Sug. col.: red and silver. Dry Kit SF-40, only..... **$1.95**

VOUGHT CORSAIR V-65

The executive design. Span 26⅞". Sug. col.: silver and blue. Dry Kit SF-41, only..... **$2.95**

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Span 20". Very pretty. Sug. col.: orange and cream. Dry Kit SF-1, only..... **$1.95**

HOWARD RACER "IKE"

Good beginners model. Span 15⅝". Sug. col.: all white. Dry Kit SF-42, only..... **95c**

DOUG. O-38 OBSERVATION

Snappy National Guard Trainer. Span 30". Sug. col.: yellow and olive drab or blue. Dry Kit SF-43, only..... **$2.95**

WEDELL'S W. WMS.

Highly detailed. Span 19½". Sug. col.: red and black. Dry Kit SF-47, only..... **$2.35**

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Extremely well detailed. Span 23⅜". Sug. col.: gray, silver, yellow and red. Dry Kit SF-49, only..... **$2.95**

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World's Greatest Line of Rubber Powered Flying Models

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2	Travel Air Mystery	2.35	.65	
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20	Hawker Fury Fighter	1.95	.80	
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22	Macon Fighter	1.95		
23	Boeing P-26 Pursuit	1.95	.70	
24	Lockheed Vega	2.50	1.20	
25	Curtiss A-8	2.50		
26	Heath Parasol	1.25	.35	
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34	Fokker D-8 Fighter	1.95	.55	
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41	Vought Corsair V-65	2.95	1.10	
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43	Douglas O-38 Obs.	2.95	1.10	
44	Page's Racer	1.95		
45	Martin Bomber	6.50	2.95	
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48	'34 Turner's W. Wms	2.35	.65	
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50	Curtiss Export Hawk	2.95	1.10	
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64	Beechcraft C-17-B		1.10	
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Generally speaking, for dopes, use 1 oz. of each color mentioned for models up to about 24" wing span. For better finish or larger jobs, order 2 oz. each. Same quantities each of cements will be sufficient. 1 oz. 10c, 2 oz. 18c; packing charges 15c on dopes and supplies only.

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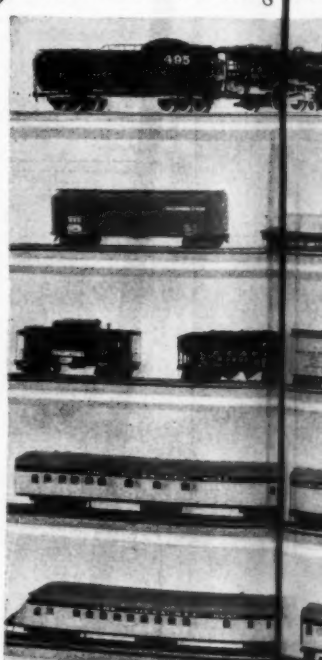
Completely Revolutionary! New "C-D Scale and Gage" from Anything now on the Market—the only Tr An Far Less Expensive Than Any Other Railroading! ore

The Cleveland-Designed Gage is Thoroughly American Model Railroading

Now, to Model Railroading, just as in the past to Model Airplane building, Cleveland brings a new day—a new interest—a great new thrill. Many years intensive study and experimental work by Cleveland's engineering staff and thousands of dollars of developmental research have resulted in this great triumph that promises to completely revolutionize American model railroading. For the first time commercially, a new scale and gage—to be known as the C-D Scale and Gage—has been completely worked out. Starting from "the ground up," with an exclusively 2-rail system (no unsightly third rail) entirely ignoring British and Continental European practices and measurements, that have always been fundamental in model railroading, we have developed commercially a truly American scale and gage—**As American as the Liberty Bell.**



Advantages of new C-D Scale and Gage

This new C-D Scale is 3/16" to the foot—Gage is ⅞" between tracks. Prototypes are scaled down to basis of 1/64" equals 1 foot. Present enthusiasts of the three most standardized model railroad gages now in existence, namely 0 gage, 00 gage and H0 gage, may at first resent the introduction of a new gage—but in all fairness to the advancement of the hobby at large, we feel the more they study and consider the C-D Scale and Gage, the more will they appreciate its many advantages. For instance, 0 gage enthusiasts will find (perhaps to their profitable advantage) it permits building almost twice as many projects as 0 gage allows, to fit a given space; 00 and H0 enthusiasts will find it permits perfectly scaled details (as easy as in 0 gage) of locomotives and rolling stock, permits alternating or direct current, and eliminates many of the headaches due to tiny defects in tracks and crossings, more difficult with those smaller than this new C-D Scale. Moreover, it puts behind model railroading the full facilities of Cleveland's designing and engineering department which has given model airplane builders the biggest variety and most comprehensive line of flying models ever known.

Unlimited Number of Projects, at Low Prices, to be Available

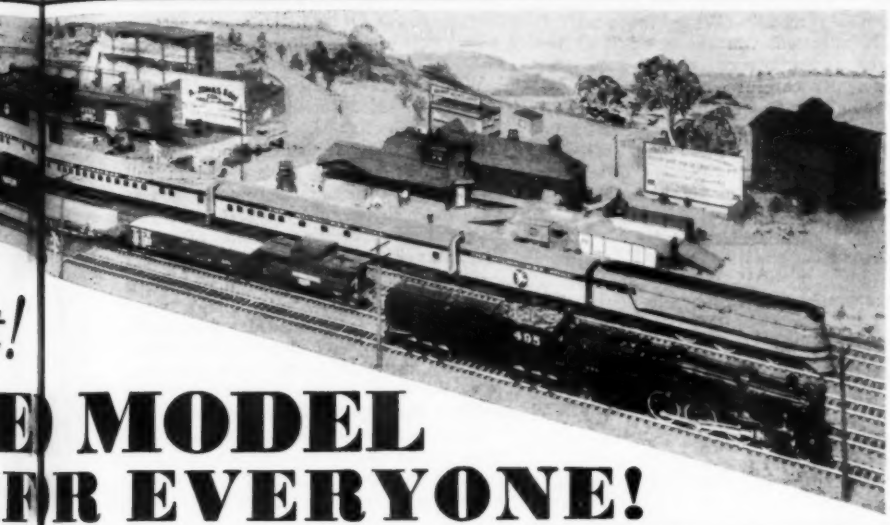
Cleveland's simplification and refinement of Model Railroading will make this hobby of unusually keen interest available to thousands who heretofore have built only model airplanes at a very low cost. It brings a broader scope to your modelmaking activities, and employs the same fundamental fascination that has made model airplane building of such keen interest to you. For the present, we are producing only what might be termed a Representative ("Rep") line of railroad models—most of which are shown in the large illustration above. Built almost entirely of wood and C-D's special RR kit features, most all are now available in kit form, and enable you, at little expense, to get started on a new adventure in model work. Any modelbuilder, with C-D's superdetailed plans, can very easily build any of the Locomotives or Cars shown here—whether it be the Hiawatha, the Pennsylvania Switcher, box cars, tank cars, cabooses, etc. at prices that run from 25c up for the simplest cars, to 95c for locomotive and tender sets.

Try Your Ha t Now—

But this is only the begin delbuild there will be a great man its avail Models," operating railro erfectly The niftiest thing about all ent RE make your final layout in ctual tr stock if you desire, by sim ring we trucks and replacing these l work ready. Present locos may for di at or in roundhouses, at sub eration

FOR GENUINE VALUE, STREAMLINE SERVICE, AND ALL-AMERICAN SATISFACTION

Model Railroads... *your best bet is a C-D!*



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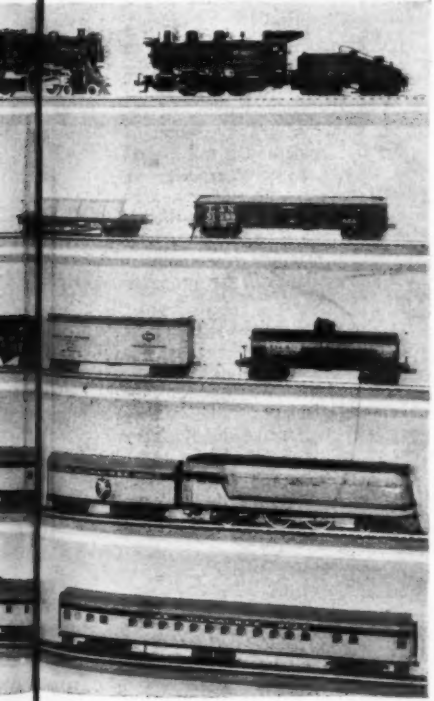
...andage" is Radical Departure ...n American Scale and Gage! ...ing! ...ore Practical! Easier Built!



For Realism in a Toy Train Layout

This C-D size is the best size car rolling stock yet designed for converting toy 0-Gauge material to a far more realistic layout. Simply remove trucks and couplers from your toy car, and presto! You have cars that really "fit in" with all your other toy rolling stock. It's the nearest thing possible to authenticity on a tin track toy train layout! Extremely easy to build, and the cost per car ridiculously low!

model railroader may now have even only one locomotive and just a few cars operating while he may enjoy a "very complete line" atmosphere at a minimum of expense, with rolling stock authentic in appearance, yet easily and quickly made.

Therefore, before deciding that Model Railroading holds no interest for you—or even before deciding that C-D is "all wet" with its new scale, for the few cents it costs—order a few kits and build them. We assure you many enjoyable hours, and an experience you will not forget for a long time. Try it! Thousands of dealers are already ordering these kits—if your dealer hasn't them,—send direct to us. Don't delay—order today.

WHAT C-D REP RAILROAD (DRY) KITS CONTAIN

1. All locomotive cabs, tender and car sides, tops and ends completely printed out where possible in original colors, only touching up necessary.
2. Wheels supplied turned, requiring only hand work to complete. They all roll, and locomotive mechanism works.
3. Necessary bulkheads, truck side frames, etc., printed out.
4. All necessary strips, blocks and pieces to complete the entire locomotive tenders or cars.
5. All fill in materials to simulate the metal or solid wood construction of the prototype.
6. All wire, bond paper, screws, escutcheon pins, axles included, etc., etc., etc.
7. And last, but most important of all, included in each kit is a completely detailed full sized, copyrighted authentic Rep drawing, enabling you to make each model most easily by the easy model design methods worked out—far more easily made than airplanes—even the "complicated looking" locomotives.

Note the Low Prices on this New (Dry) C-D 3-16" Scale Model Railroad Equipment—Send Your Order Today!

Average overall sizes Locomotives, 12"—17"; Passenger Cars 15"; Box Cars, 8"; heights 2½" or over.

	Order Kit No.	Ea.
Penn. Switching Locomotive (0-6-0) and tender	RL-1	.65
C & O Pacific (4-6-2) Locomotive and tender	RL-2	.85
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Hiawatha Express-Tap Car	RS-2	.75
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Hiawatha Beaver Tail Car	RS-4	.75
Flat Car C & N W lettering	RF-1	.25
Flat Car Pennsylvania	RF-2	.25
Box Car N.Y.C. 50 Ton Steel	RB-1	.45
Box Car B & O 50 Ton Steel	RB-2	.45
Box Car B & O 50 Ton Wood	RB-3	.45
Box Car Rock Island Wood	RB-4	.45
Box Car Wabash Wood	RB-5	.45
Box Car Southern Pacific Wood	RB-6	.45
Box Car Union Pacific Wood	RB-7	.45
Box Car Texas & Pacific Wood	RB-8	.45
Box Car Santa Fe Wood	RB-9	.45
Box Car Missouri Pacific Steel	RB-10	.45
Refrigerator P. F. E.	RR-1	.45
Refrigerator F. G. E.	RR-2	.45
Tank Car (white) GATX 8000 Gal.	RT-1	.35
Tank Car (black) NATX 8000 Gal.	RT-2	.35
Twin Hopper Car CCC & St. L. 55 Ton	RH-1	.40
Twin Hopper Car MP 55 Ton	RH-2	.40
Gondola L & N 50 Ton	RG-1	.35
Gondola Pennsylvania 50 Ton	RG-2	.35
Caboose Pennsylvania N5	RC-1	.45

PLEASE REMEMBER NO LIQUIDS SUPPLIED (CEMENTS AND COLORS).

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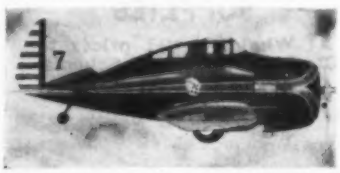
...AGN, YOU CAN'T BEAT THE KITS AND SUPPLIES OF—

20" REP STINSON RELIANT

Beautiful taper wing design model. Extremely graceful in flight and very stable. Suggested coloring: cream and green. Dry Kit R-66, complete (except liquids), postfree, only..... **65c**



The New SEVERSKY FIGHTER, P-35

77 of these unusually bulky, but unbelievably beautiful planes have just been ordered by the U. S. Army because of its high speed and super performance. Span 24", beautifully colored, blue fuselage, yellow wings and tail. Very nicely trimmed with red stripe and white outline. Landing gear may be extended or retracted for display in any position. Super complete in every way, but DRY. Kit SF-61, postfree, only..... **$2.65**

Dwarf Dry Kit D-61..... $1.10

Ever Popular CURTIS-HAWK P6E

A model as beautiful as any ever built for the most exacting exhibition requirements, yet, it is capable of very good flights at a fast clip. Suggested coloring, yellow and olive drab with the beautiful Hawk color striping of black and white, characteristic of the Selfridge Field Squadron. Fuselage owl and U.S. Insignia comes ready to apply. Span 23¾". Dry Kit SF-21..... **$2.50**

Dwarf dry kit D-21..... 95c

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Thousands have already been mailed out—and every day brings another tremendous rush of requests. Don't delay—it's the greatest model and homecraft catalog ever offered—better, fuller and much more complete than our 1st Edition, which was completely gone within 60 days of the time it came off the press. Get this great new catalog at once—packed with flying models, solid models, gas models, parts and supplies; R.R.'s and supplies; ship models; thousands of tiny items never before assembled between two covers. Well illustrated. No modelbuilder can afford to be without it. Rush 15c with your name and address right away to help cover packing and mailing, and we'll send your copies.

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"America's Foremost Model Engineers—Since 1919"

1866N West 57th St., Cleveland, Ohio, U.S.A.

Build This Winner of The Bendix Model Trophy

(Continued from page 9)

lage so that the model is slightly nose heavy. Now test the model the same as any other model. When the model is finely adjusted, you can wind it to full power and get ready for a good long chase. By careful winding you can get 750 winds in this motor, I have had 850 winds in mine; but do not advise a beginner to try to get this many. With the 850 winds the prop run was 97 seconds, during which the model had an exceptionally steep climb.

Air Ways

(Continued from page 19)

Zakim. They are a Hawk F11C-2, Lockheed Orion and the Sikorsky S-43. All are eight inches in wing spread. Even though they are small, details have not been neglected.

Picture No. 5 shows a very fine flying scale model built by Joseph H. Wherry of 8 North 9th Avenue, Yakima, Washington. Perhaps the reason we like it so is that it was built from plans in MODEL AIRPLANE NEWS. At any rate, Wherry has done full justice to the plans.

Stephen Kowalik lives at 412 South Heald Street, Wilmington, Delaware. Readers will recall that Wilmington is one of the glider centers of the United States, so it is natural that Kowalik has become interested in this sport. Picture No. 6 shows him with his six foot model of the Dupont Albatross II, with which Mr. Richard Dupont set the distance record in 1935. This little model is a duplicate of its big brother and has flown out of sight on several occasions. He was fortunate in having it returned.

Picture No. 7 shows what your editor chooses to call "the heavenly twins." The models are practically identical, one built by Bob Jeffery and the other by Bob Chatelain of 618 McConnell Street, Findlay, Ohio. Chatelain tells us that they were both at the Detroit Nationals but failed in the contest. Later they lost both of them on the same day; Chatelain at two minutes directly overhead and Jeffery at thirteen minutes.

We have a very interesting comment from Leonard W. Meacham of 179 Westford Avenue, Springfield, Mass. From what he says we judge that he is one of MODEL AIRPLANE NEWS oldest readers. He writes:

"If you look in your files I believe you will find I subscribed to MODEL AIRPLANE NEWS from the very first issue. I now have all of the issues up to date."

In one of our past issues we asked readers to let us know if they like the idea of the Nationals being held later in the summer. We have an answer from a contestant who ought to know considerable about national events as he has attended most of them. He is Jim Cahill of 1419 North Gale, Indianapolis, Indiana. Jim is very much in favor of the idea and also says:

"I believe it would be a good idea to arrange the contest close to the end of the week instead of in the middle of the week as last year. It is easier to ask the 'boss' for a few days off then. I like the last week in July."

MODEL NEWS FROM OTHER COUNTRIES

Italy

We have a very interesting contribution from Italy. Mr. Enrico Barzetti of Viale Reg. Margherita 83, Ardenza, Livorno, Italy, has sent us picture No. 8, which shows Aldo Favilla's stick model in full flight at the 1936 national contest. It was the winner in the tube category. He also sends us an interesting resume of model flying activities in Italy. It is as follows:

"Flying models is a sport that Fascisti boys follow seriously and with great enthusiasm. In the aeromodeller schools the R.N.A.U. (Royal National Aeronautical Union), instituted in all cities, the boys learn theory of flight and gain experience through building simple models.

"Only after they have grown older, become expert and have been active in many competitions, do they build different models according to their own ideas.

"Every year the Aeronautic Union publishes a national resume of model activities, with a list of the Italian model builders who have participated in contests and details of the models of every type which were used. Many prizes are given, sometimes money and sometimes medals. There is great competition between cities to see who will win the beautiful trophy offered.

"As a rule beginners build gliders so that they will learn how to adjust the model correctly for different types of flights. This entails understanding of the relation of the center of gravity, center of pressure and the attitude of the tail planes. Later when they are more experienced, builders make machines with rubber motors using a tube for the fuselage. The tube is made of sheet maple 1/32" thick. By means of such a machine something is learned of the reaction of the propeller on the model.

"The next step is to build scale models with fuselages and with rubber or gas power. As a rule Italian model builders do not build reproductions or scale models of original large airplanes because they think an airplane and a model have very different characteristics."

From the last paragraph it is evident that Italian model builders have fully realized a fact of which Americans are not always aware.

Belgium

The building of large size gas models has prompted Alfred Van Wymersch of 14 rue Berkendael, Forest, Brux, Belgium, to build a correspondingly large glider. Picture No. 9 shows one of three meters spread, which he has made recently entirely out of balsa. He says that it has an extremely flat glide and that he intends to fly it soon for a record, as soon as a good location for the flight can be obtained. This glider is double the size of another glider which he designed and which flew out of sight after a duration of ten minutes.

(Continued on page 43)

Building A Streamline Gas Model

(Continued from page 14)

Cut out two beam supports for fitting "C." They appear on the same drawing with the engine bulkheads. Shellac them thoroughly and after dried, put on fitting "C". Bend over the lower flange of this fitting, thus holding it securely in place. Then drill the ⅛" hole in the plywood, using the holes in the fitting as guides. Place the beam supports between bulkheads "A" and "B" as shown in their end view on the bulkhead drawing. The concave side should be down. Nail them in place.

Cut the clamp bar from ¼" brass tube, flatten as shown and drill the ends for a 6-32 tap. Use the tap when you are sure that the holes are the right distance apart.

Cut two ½" diam. holes in the silked skin of the fuselage directly over the holes in the beam supports. Through these holes, you may reach the tightening screws for the motor mount. The screws are 6-32, 1¼" long. Two are required. Push these into their holes in the beams and attach the clamp bar to them by a few turns of each screw with a screwdriver through the ½" holes. To attach the motor mount, merely shove it into the fuselage until fittings "A" and "D" coincide, and tighten the screws all the way down. It is not necessary to use all your strength in tightening these screws, as there should be some resiliency. Do not allow too much, however. A few turns of each screw is sufficient to remove the mount.

Cut two pieces of 3/16" steel rod 2¾" long and shove these into the holes drilled for them in the bulkheads. Cement is sufficient to hold these in place, since there is no tendency for them to be pulled out when the shock cord is wound around them.

Cut four pieces of hard balsa ¼" x ⅛", long enough to fit snugly between bulkheads "A" and "B". These should be cemented to the inside of the skin, lining the hatch holes on the top and bottom, quite flush to the edges. Cut the guides to size and shape from .006 sheet brass. The ⅛" holes should be punched with a scribe or some similar tool. A slit is then cut in the skin so that the guide may be inserted. Push the guides into these slits and cement the guides to them on the inside. The punched holes will prevent the guides from pulling out. Cut two hatch covers from the same brass, making a tight fit so that they will pull out only when the fingers are pressed against them and pulled.

From .006 brass, cut a strip ⅜" wide to cover the break in the fuselage. This is attached to the front part of the fuselage by straight pins through the last bulkhead. The pins are clinched on the inside rim of the bulkhead, and the ends of the strip are joined on the bottom center line.

The wing fillet, which in this case acts as a wing mounting, is next constructed. Cut the two pieces of hard balsa, 9" x 1" x ¾" (No. 3), and shape the bottom of these pieces to fit on the fuselage exactly as shown in the drawings. With this as a basis, cut out block No. 4, first in plan form, then shaping the bottom to fit the fuselage curve. Cement this in place immediately behind blocks No. 3. The next to go on is block No. 1, which is also shaped in plan before cementing. Fit to the fuselage curve as block No. 4 and leave as is. Now cement blocks No. 2 in their places as shown.

Following the plan and using the general idea given from the pictures, shape the fillets with a knife. Be careful not to make the edges too thin. Complete shaping with rough sandpaper without a block. Finish off with fine sandpaper and cover neatly with silk.

Cut out and shape a tailskid from pine. Insert a piece of 1/16" steel rod as a runner as shown. Cement the tailskid to the skin in the position shown, directly below bulkhead "V".

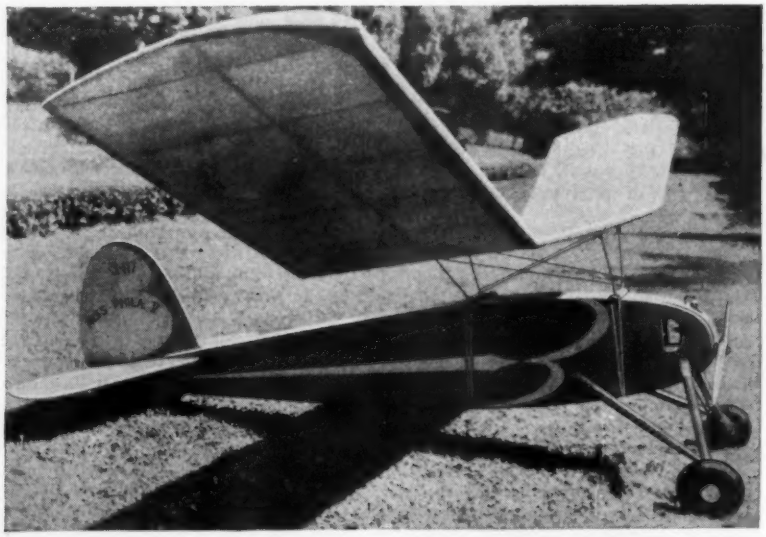
Cowling

As can be seen from the drawings, the cowling is constructed from a number of longitudinal "lifts," which, when cut out accurately will eliminate all but a very small amount of carving.

Cut all the lifts from 1" balsa of any convenient grade (soft balsa will be easier to handle). When they are cut with a jigsaw, mark on each of them the position of the next bulkhead down. These are determined by the outline of the blackened portions on each lift. Starting with lift No. 8 cement the lifts together, holding them together while drying. When both sides of the cowling are completed (don't forget that the lifts are opposite for each side) lay them aside to dry quite thoroughly. Do not touch the cowling until everything else on the plane is completed.

When you get back to its construction, you can carve the outside with a knife and rough sandpaper. It should not be necessary to use a template here because you need only to cut a smooth flowing curve between each lift, until all traces of corners are removed. Mark the opening holes from the templates on the front of the cowling and cut them out with a knife and a gouge. Before silking, pin pieces of balsa to each side from lift No. 1 to lift No. 8.

FOR the past six months we have been working on Plans and Specifications of the world-famous "Miss PHILADELPHIA" Gas Model, under the personal supervision of Mr. Maxwell B. Bassett. We have spared no expense to bring the model builder the finest in gas powered planes. Every detail has been duplicated exactly as employed on the original model. The "Miss PHILADELPHIA" won FIRST PLACE in every CONTEST entered in 1936—a record in itself!! Now you, too, can have this championship model. Here is the



BIG NEWS!

HERE AT LAST—AN EXACT DUPLICATE OF MAXWELL BASSETT'S CONTEST WINNING GAS POWERED 8 FT. MODEL

MISS PHILADELPHIA

YES SIR!! Here is the Exact Model that has won every major gas model contest in recent years!!!

Read the following partial list of records made by Maxwell Bassett with this sensational Model:

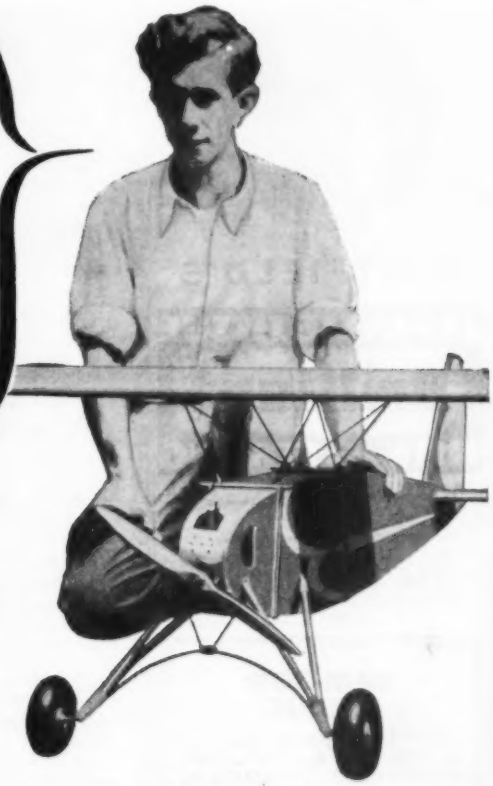
OCTOBER 1936—1st Place I. G. M. A. A. Meet (For Consistency and Endurance) 1/16 oz. Fuel/lb. Time: 18 Minutes
OCTOBER 1936—1st Prize Winner in First Payload Contest (At Hadley Airport, New Brunswick, N.J.)
JUNE 1936—1st Place I. G. M. A. A. Semi-Annual Contest (Present Holder of I. G. M. A. A. Gold Trophy) 1/16 oz. Fuel/lb. 5/16 oz. Fuel in Tank. Time: 24 Minutes.
AUGUST 1935—1st Place National Junior Birdmen Gas Model Contest ⅛ oz. Fuel/lb. ⅝ oz. Fuel in Tank. Time: 18 Minutes, Establishing New World's Record.
JUNE 1935—3rd Place "Nationals" St. Louis. Time: 37 Minutes with 1½ Minutes Engine Run.
(All the above records were made without assistance of thermal currents which usually contribute to winning flights.)

The "Miss PHILADELPHIA" Gas Model has won 1st Place in every contest entered, with the exception of the 1935 Nationals at St. Louis, when engine trouble developed. Despite this handicap, the model showed a wonderful performance with a flight of 37 minutes with only 1½ minutes engine run, taking 3rd Place as listed here.

The original "Miss PHILADEPHIA" has flown more than 1,000 times, with almost 100 hours to its credit. This model is still in good flying condition. It is powered with a Brown Jr. engine, but you can install either the Brown Jr., Baby Cyclone "D" or the Ohlsson, or any reliable engine on the market, and get perfect performances with the model you build.

MAXWELL BASSETT'S "MISS PHILADELPHIA" GAS MODEL

YES, FELLOWS! SCIENTIFIC SURE HAS MADE A SWELL KIT OF MY "MISS PHILADELPHIA" GAS MODEL. THE PLANS WERE DRAWN DIRECTLY FROM MY ORIGINAL MODEL SO THAT THE KIT WILL BUILD AN EXACT REPRODUCTION. THIS KIT CERTAINLY IS A HONEY!



8 ft. WINGSPAN :: 57 in. LONG
WEIGHT (less motor) 3½ lbs.
FLYS FOR ONE HOUR ON AN OUNCE OF FUEL

Gliding Angle: App. 25 to 1 **Climb: App. 300 ft. per Minute**

— *SPECIAL FEATURES* —

STABILITY: High wing improves stability 60%

FLEXIBLE WING SUPPORTS: Should end of wing hit any obstacle on landing, the flexible wing supports eliminate any possible damage.

CRASH PROOF LANDING GEAR: Landing gear is attached to fuselage with bolts which allow it to pivot. Rubber bands hold the "V" Struts together at axle and provide the "give" required when landing. Should the landing gear become twisted in an exceptionally hard landing, it is easily straightened again as all parts are movable.

BEAUTY: High-set wing adds grace and beauty to the model, which is colored blue with yellow scallops on the wing, yellow and blue fuselage.

OTHER FEATURES: Detachable wing. Adjustable Rudder Control. Aluminum cowl hatch swings open for easy access to motor.

SPECIAL COMBINATION OFFERS!

Special Combination Offer No. 1 "Miss Philadelphia" Kit Brown Jr. Motor Tru-Pitch Propeller REGULAR VALUE	$9.95 21.50 1.95 $33.40	ALL FOR **$28.00** POSTPAID
Special Combination Offer No. 2 "Miss Philadelphia" Kit Ohlsson Motor Tru-Pitch Propeller REGULAR VALUE	$9.95 18.50 1.95 $30.40	ALL FOR **$26.00** POSTPAID
Special Combination Offer No. 3 "Miss Philadelphia" Kit Baby Cyclone "D" Motor Tru-Pitch Propeller REGULAR VALUE	$9.95 17.25 1.95 $29.15	ALL FOR **$25.00** POSTPAID

COMPLETE KIT— with all items as listed below

$9.95 POSTPAID LESS MOTOR

Ask Your Dealer—If He Has Not Yet Ordered His Stock—Send Your Order Direct

Note the convenience of Motor housing, as shown above, with aluminum cowling which swings up to permit easy access to motor.

"MISS PHILADELPHIA" is 100% Complete Including

Ready Shaped Leading and Trailing Edges with Notches Cut for Ribs; Special Design, Finished 14" Hardwood Propeller. 1 Pr. of Pneumatic Rubber Wheels.

Ready Made Balsa Wood Ribs with Notches for Spars.

Complete printed balsa including all bulkheads, rudder sections, etc.; all strip wood of finest quality accurately cut to size, and ample quantity to complete model; bamboo covering paper; large amounts of gas model cement and special yellow and blue gas model dope; streamline tail wheel; aluminum plates to make adjustable motor mount to fit any motor; aluminum hatch printed on the correct gauge sheet aluminum, complete set of hardware such as knife, switch, 2 sets of jacks and plugs for attaching booster batteries, nuts, bolts, machine and wood screws, tough landing gear wire, threaded, and complete with 4 nuts, sheet metal, battery wire, washers, etc.; finest strip spruce for parts needing added strength; complete assortment of numerals, lettering, and "Miss Philadelphia" insignia printed in color on gummed paper; and 3 Jumbo full-size detailed plans giving every bit of information needed for building, along with photographs, diagrams, instructions for building and flying, etc. Unquestionably the finest Gas Model Kit ever offered by anyone!!

Send 10c for New Jumbo Catalogue of Model Kits, Gas Model Kits, Motors, and Supplies

SCIENTIFIC MODEL AIRPLANE COMPANY

218-220 MA-5 Market Street, *"GAS MODEL HEADQUARTERS"* Newark, N. J.

In France: E. Kruger & Co., 9 Rue St. Sebastien, Paris
In England: W. & S. Norman, 46 Derby Rd., Kirkhams, Prestwich, Lancs.
In Australia: Swift Model Aircraft, 156 Adelaide St., Brisbane, Queensland.
In South Africa: Stratosphere Model Aircraft Supplies, P.O. Box 3248, Johannesburg.

This will prevent distortion. Now silk both halves.

Hollow out the insides of the cowling, again using the joints between the lifts as guides. This method will give a wall uniformly 3/32" thick. Taper to a sharp edge at the rear of the cowling. Coat the insides with a coat of dope, a coat of shellac and a coat of ordinary gray or black paint.

On the original job, tape hinges were used, running a piece of tape inside and out the length of the cowl over the joint between the two halves. Small brass hinges may be substituted if you wish. In this case, imbed them in the balsa wall on each side and drive pins through the wall and the hinges to prevent them from being pulled out. Tape the following portions of the cowl in the following sequence:

1. The air inlet, folding the tape over the edge; this may have to be done in two pieces on each half.
2. The rear of the cowling to protect the shape edge. Do not fold over the edge.
3. Tape over each of the joints between the lifts. Do not lap these pieces of tape with any other taped portions.
4. Border the top and bottom of the cowling on each side. Do not fold or lap over.

Attach now fitting "F" to the front engine bulkhead "A". The lower one will have to be bent over as shown in the bulkhead drawing. The third of fitting "F" is attached to the engine mount by one of the motor bolts as shown in the motor mount drawing. This is the front anchorage for the cowling. Open up the cowling, slide it over the fuselage with the motor mount attached and find experimentally the points where the cowling must be punched through to permit the three ¼" 6-32 machine screws to engage in the threaded portion of fitting "F". These three screws will hold the right portion of the cowling secure, permitting the left side to be raised and lowered at will. A single large dress snap, placed on the lower portion of the cowling and backed up by small odd blocks will hold the left side down. If you have any other sort of snap arrangement, you may use it, providing you are sure that the balsa is properly backed up so that it will not be crushed and rip out.

Propeller

The drawings for the propeller template were given last month. Cut these, from Bristol board or aluminum, making one each for plan and profile. Punch a small hole in the plan template to mark the center of the propeller shaft hole. The propeller block is 1¼" x ⅝" x 15". Poplar will be found an excellent material. It is also possible to use pine or bass. If you use pine, get a good grade. Note the dash marking on the end of the plan template. This is for lining up, so be sure to include it.

Draw a straight line down the center of the block. Drive a pin through the hole in the template into the wood, right on the center line. Line up the marking on the end of the template with the center line, and draw around the template. Swing around the template, line it up again and trace once more. Trace the profile template.

Markings complete, drill the hole for the prop shaft. Usually this is ¼" diam. In shaping the blade (notice that a left-handed prop is used) a wood rasp will be found to be a great convenience. Note that there is no undercamber on the typical section, but tends more toward a streamline section.

Nicely finished propellers add much to the appearance of the finished ship. Finish off with a good grade wood filler, following with many coats of white lacquer, sanded lightly between coats.

Assembling

The first job, of course, is to attach the two sections of the fuselage. Use the amount of rubber noted before and tie in a very secure knot. These covers are attached with small dress snaps. In position, they lend a natty appearance to the fuselage.

Next comes the undercarriage. Slide the shock arm through the undercarriage hole; the bearing should slide in quite nicely to fit snugly between the bulkheads. Shove a 3/16" wood dowel through bulkhead, the bearing, and bulkhead "B". By no means should anything but wood be used. To wind the shock absorbers, slide open the hatch covers. The shock cord consists of about a foot and a half of 3/16" flat rubber. It should be wound fairly tightly, but do not stretch it to more than twice its length in winding. This is important because if the cord is wound too tightly, a strut might be strained in a "hot" landing. If properly adjusted, the undercarriage will absorb the shock from the hardest landing the ship will undergo.

The next and last assembling job is to mount the wing. It is held in place with 3/16" flat rubber wound around as can be seen from the photos. Before putting on the rubber, cut out ½" x 2" rubber pads from an inner tube. Place these on the mount and put the wing on top of this. This will eliminate wing slippage. Put on enough rubber to hold the wing secure without putting undue strain on it.

Painting

Of course painting should be done when the plane is completely apart. The original had a color scheme consisting of red and white. White will take nicely to the smooth skin of monocoque construction. Be very sparing with the lacquer, because the silk has a habit of absorbing a great deal of it, adding weight. One light and one regular coat will suffice. Rub down between coats with automobile rubbing compound. The finished surface may be waxed with beautiful results.

Flying

One would expect a lot of trouble starting an enclosed motor such as this. However, the three flashlight cells will give very quick starting and the arrangement inside the cowling is very convenient to starting. Once your motor has been run in properly, follow this procedure in starting the motor:

1. Set the needle valve at a slightly rich mixture.
2. With the switch on, choke the motor until it pops once.
3. Close the cowl and flip the prop until the motor starts.

The motor should start after the third or fourth flip, and sometimes sooner. It is not

necessary to start the motor on a rich mixture or a retarded spark or to touch it in any way after it has started.

It will be found that a ship of this type of construction will not require much trimming. With the down thrust of 1.5°, the C.G. should come out about 40% back of the wing leading edge. Overhand glides only in soft pastures should be attempted, trimming with rudder and elevator tabs until the ship has a smooth, flat glide. You will be surprised at the distance travelled in gliding and the speed of the glide, so take many precautions to choose a large spot.

Use no more than two eye-droppers of gas for the first test flight. Get the ship in as low grass as possible. It is best to take off from concrete, heading the ship toward grass. It will be found that crack-ups on concrete will not affect this ship as much as any other. Start the motor going, head 'er smack into the wind, push ever so slightly, and then the matter is out of your hands.

Should the model tend to nose upward, place two U-shaped pieces of brass over fittings "A" to increase the down thrust. If the plane shows no alacrity in taking off, place these same pieces on Bulkhead "B" where the mount rests. They will have to be held on with a clinched pin in this case.

It should not require more than a flight or two to get proper adjustment. The original required but one, although the wing had flown on other jobs previously. When entering this model in contests, do not fail to include the cowling, since its absence does not bring the model up to N.A.A. cross section ruling. It will be found also, that leaving the cowling off completely nullifies all the extra streamlining you have worked on.

Again let me caution you to be wary of the fast flight and glide of this model. It will have the tendency to go straight downwind at a pretty fast clip, even in a glide, covering plenty of territory.

Indoor Plane Facts

(Continued from page 7)

permit the stabilizer to bank.

This can be corrected by bending the wing clips so that the wing assumes a bank when you are holding the ship prior to launching. For example, if you notice the stabilizer in a left bank while the model is flying, bend the clips to put the wing in a left bank. Then when the ship is flown again, the wing and stabilizer will both line up parallel to the floor. If the wing banks slightly, wash the low side in; that is, warp a little more incidence into the half which is low.

When the ship flies fine on 500 winds, try it with more. Keep increasing it 200 turns every flight, until the ship shows signs of trouble. If possible, cure the illness as prescribed above. However, some new faults may have cropped up. If the ship dives, or races around at high speed without gaining altitude, watch out for loose or weak wing clips; then hold the motor stick and let the prop revolve, checking it carefully to see that it is not leaning forward (down thrust) even the slightest bit; also, check up on your wing structure, which may have weak spars, or weak ribs, or poor rib-to-spar joints. Another cause may be side thrust, with the bearing slightly out of line so that the propeller is pulling the ship into the circle. Check on this by holding the model out in front of you, tail down, so that you get a top view; allow the prop to turn and inspect *very* carefully to see that it is not leaning even a trifle towards the left wing. Go over these things conscientiously, testing the ship many times to see if you have eliminated the trouble. However, if you are still unable to locate it, bend the bearing so that the prop leans backward just a hair. This should take care of the matter, but if necessary advance the wing very slightly.

Now let's suppose that, instead of diving, your ship was having stalling trouble. The very first thing to check on is to see that you still have the wing placed so that the center of the chord is directly above the center of gravity. Next, check in flight so see that a line from wing tip to wing tip is parallel to the floor. Third, check the same as number two, but on the stabilizer. This one, especially, seems to bother most experts the same as advanced students. They completely forget to watch the stabilizer in flight. Correct as described in the instructions for testing with 500 winds.

Fourth, examine your prop while revolving to see that it has neither upthrust nor right thrust. Fifth, see that the stabilizer does not assume a negative angle in flight. Sixth, you may have washin on your right wing. Seventh, the rudder may be loose, or very weak. And lastly, the fault may lie in the design. The stabilizer area should be at least 28% of the wing area, and preferably more. Ships with small stabilizers lose more duration from stalling easily than they gain from decreased drag. Besides, the gain from decreased drag is considered very questionable by those experimenters who have been using extremely large stabilizers with great success, getting quite a bit of lift out of them. Some have even used successfully stabilizers with as much as 90% of the wing area. To get high duration consistently, your ship should have a stabilizer area 33% of the wing. Also,

you should have a long enough moment arm. The overall length of the ship should be at least three-fourths of the wing span. This length should be split into about 55% motor stick, and about 45% tail boom. For example, if your span is 36", the overall length should be 27". Then 55% of 27" is about 15", the proper length of motor stick, and the boom is 12". This applies on all indoor ships with between 90 and 150 square inches wing area.

See if you can't find the cure for the stalling in the various indicated remedies given above. But if the trouble persists, and you haven't much time, bend the bearing so that the prop leans forward just a shade (downthrust). If you have time, the better way is to add 1/16" positive incidence to the wing, and 3/64" positive incidence to the stabilizer. You will also find it helpful to move the wing back a bit, although this may be injurious to the latter part of the flight, forcing the ship to come down quickly. The safest thing always is to leave the wing in the position where the best glide is obtained, and adjust the ship by the other means described.

Now that you have the ship adjusted at this stage of winding, proceed once more to add 200 turns on every flight until you again run into trouble. Correct as before, and in this way you will eventually reach full winds. Remember that nearly all airplanes, from Baby R.O.G.s to giant transports, become a bit tricky when full power is applied. As a result you must be especially careful then, to see that you handle the ship right. Launching should be made as follows: Hold the propeller in your left hand and the ship in your right. The thumb and forefinger should hold the stick where the wire clip encircles it. The clip will prevent your perhaps nervous fingers from squeezing the stick too hard, causing a premature end to your flight. Point the nose of the ship up at exactly the angle you expect it to climb, and bank it slightly towards the inside of the circle. Allow the prop to revolve an instant, and then set the ship gently into the air along the path you expect it to take. It should take a spiral path, climbing steeply and with a forty foot or less circle.

There is much more to flying a model than the adjustments described above. For one thing, winding is a most important feature. First of all, obtain or make a 10 to 1 ratio winder. A good one can be purchased for 50 cents, or you can make one from clockworks. Winders of 25 to 1 ratio are not recommended, as they are geared so highly that the feel of the rubber through the winder, so valuable to expert winding, is lost; also, they are not practical to wind for full power, or sustained power, because one must allow an exceptional margin of safety throughout the winding period for fear of breakage. Further, with a 10 to 1 winder, one can tell instantly, at any time,

exactly how many turns are in the motor.

Proper winding is, above all else, a matter of practice. Several boys, starting with the simple formula given below, have practiced winding at home, with the motor hooked to the door or a bed; and after five or six hours, they developed little knacks of their own, and became very good at it. Winding is also a matter of nerve. You must believe that the motor won't break.

Be sure to use special brown rubber, the kind made especially for endurance models. Next, use a good lubricant, the type made from pure green soap. A square knot should be carefully tied with the ends of the rubber. Now take the knotted end and the opposite end of the loop, and bring them together. Dip the rest of the rubber into your can of lubricant, and put your thumb over the hole, leaving the front and rear ends of the motor *outside*. Then shake the can thoroughly, take the rubber out, and massage the lubricant into the strands. But be careful not to get any lube on the front end or the knot.

Here is a simple, easy and practical method of winding. Attach the rubber to the propeller, and get someone to hold that end of the motor in such a way that if it broke it could not harm the prop or any other part of the model. Next, stretch the motor to three times its length; that is, a 20" loop should be stretched to 60". The best way to do this at a contest is to know the length of your shoes, and thus measure off, heel-to-toe over and over, the required distance. Now start pre-winding. If your motor is capable of 2,400 turns, put in about 1,500 in the pre-wind, which is merely intended to "break it in." Wind carefully and come in slowly so that by the time you have put in 1,000 turns, the motor is stretched only 40". Put in the last 500 turns while coming in the remaining 20". The formula, then, is this: Put in two-thirds of the desired turns while coming in one-third of the distance.

For official flights, wind to the limit on either the second or third winding, lubricating thoroughly just before you start to wind. Then stretch the motor to *five* times its length, and put in about 1,600 turns while coming in one-third the distance.

Next month, we'll talk about the latest method of holding the rubber motor so that in case of breakage it cannot harm the plane, about the newest dope on motor sticks, and many other things vital to success in indoor flying. Until then, start making plans for your 30-minute ship!

Build This Stinson from Scrap Wood

(Continued from page 13)

developing high speeds at frequent intervals with pauses of a few minutes at each landing and other factors, all had to be carefully studied. As a result, among the planes developed expressly for this type of service is the Stinson Model A Tri-motor, considered to be one of the best in the field.

The Stinson Tri-motor seats eight passengers and two pilots. The wing span measures 60' and the length 36' 10". It stands 11' 6" high. It is powered with three Lycoming 260 hp. engines whirling Smith controllable pitch props. It takes off with a full load in a run under 800 feet, climbs 1000 feet per minute and cruises at 5,000 feet at 162 m.p.h. Its service ceiling with three engines is 15,000 feet.

Among the airlines which use the Stinson are American Airlines and Pennsylvania Airlines.

All the parts in the plan for making a silhouette glider of this ship are listed below with their respective dimensions:

Bill of Materials

A. Wing, 1/32 x 2⅛ x 11¼
B. Fuselage, 3/32 x 1⅜ x 6⅞
C. Rudder, 1/32 x 1 13/16 x 1 11/16
D. Elevator, 1/32 x 1 13/16 x 5
E. Engine nacelle (make two) 1/16 x ¾ x 2⅝
F. Fillet piece 1/16 x 3/32 x 1 7/16
G. Wing rib (make two) 1/16 x 5/32 x 2/16
H. Propellers (make three) 3/32 x ⅛ x 1½
I. Wheel (make two) 7/32 x ½ diameter
J. Landing gear fork (make two) see directions
K. Landing gear strut (make four of bamboo) 3/64 x ⅛ x 1 7/16
L. External brace strut (make four) 3/64 x 3/32 x 1⅝
M. Compression strut (make four) 1/32 x 1/32 x 11/16
N. Tail wheel (full size)
O. Radio mast 1/32 x 1/16 x 15/16 bamboo
P. Pin axles for wheels
Q. Position for the nose weight
LE Leading edge of wing.

The first step is to make an outline tracing of the main parts of the model which are, namely, the wing (half of which is shown), the fuselage, rudder, elevator (shown half), engine nacelle, wing rib (letter G) and the fillet piece (letter F) onto the balsa selected for use. The rest of the parts may be made by taking that part's measurement directly from the plan and cutting the piece of material to fit.

To make the model easier to assemble, it is best to have all the struts and other small details shaped to fit and ready for use.

The wing is cambered the usual way, i.e., over a steaming kettle—never a flame. Remember, although half of the wing plan is shown, the wing is made in one piece. Note how the wing as shown in the front view tapers in thickness toward the fuselage. To get the effect on the model's wings,

the following must be observed: When the wing is in its curved form, mark off its center, then crack the wing slightly raising each of the outer tips to a dihedral angle measuring 5/8". Now apply cement along the crack generously and fit the wing to the bottom of the fuselage shown by the curved white line which represents the wing curve which is above the fillet piece, letter F.

The fillet piece is then cemented in place immediately afterward. The next step is to place the wing ribs, letter G, in their respective positions. A couple of small model making pins pushed part way from the upper surface of the wing into the rib will do lots to hold the curved surface in shape until the cemented ribs dry thoroughly. Remove the pins later.

The next step is to attach the engine nacelles in position. It is absolutely necessary that the curved slot of the nacelle as shown in the plan be identically cut out on the wood parts. Apply cement along the slots and slip each nacelle over the wing. Check for alignment from both front and top views. Note the small slot cut out of the under part of the nacelles. The landing gear struts, letter J, are attached at those points.

Of the landing gear struts, letter J is the most important as it is subjected to all of the landing shocks. Therefore it must be made strong to withstand the strain imposed upon it. It is built in the following manner: From the front view it appears to be like the letter U in an upside down position with a handle on it. This is otherwise known as a fork type landing gear. The folks are cut to shape with the aid of the corner of a razor blade from 1/32" sheet balsa. Make six forks. Each fork consists of three pieces (each piece being a fork) which are laminated cross-grained. Apply cement to all parts and allow time to harden. In the meantime, shape the landing wheels from soft balsa.

When the forks are ready, apply cement around the top "handle" and some in the nacelle slot. Attach each fork in its respective position. Keep the tail end of the fuselage in level flight while the cement hardens.

The next step is to attach the landing struts, letter K. Both front and side views show how it is done. The K struts are strips of bamboo cracked as shown on the plan and cement applied liberally at the crack so that it will harden in that position permanently. The landing wheels are placed in position by the usual method using a small pin for the axle.

The tail wheel is attached after completion of the landing gear assembly. The radio mast is shaped from bamboo and attached as indicated by letter O. Carve the three props and place pins through their centers. Work each prop so that it spins freely in the slightest breeze. Attach the rudder and elevator in place and check for alignment. A piece of white thread is used for the antenna wire and runs from the mast to the front of the fin as shown in the photograph.

Letter Q shows the position of the nose weight. Cut out that portion with a razor

blade. You may proceed with the painting of the model at this time. As you will note the struts, letters L and M have not been attached. This is done so that you will be allowed greater freedom with your paint brush in painting the windows and fuselage stripes. They are cemented in after the paint has dried. It is best to leave the spot where connection of wood parts are to be made unpainted until the parts are cemented in place. Then touch up these places.

The color scheme is as follows: The entire fuselage is painted royal blue. The leading part of the wing, that is, the portion forward of the diagonal white line shown on the wing plan, is painted in blue and the trailing part crimson. The same method is used in painting the elevator—forward part, blue; rear part, crimson. The stripe along the sides of the fuselage is crimson bordered above and below with thin stripes of aluminum. A thin aluminum line separates the two colors of both the wings and the tail surfaces. The fin and rudder are outlined in crimson and below it all around is a thin aluminum line. Note how the fuselage stripe connects with the outline stripes of the rudder. The nacelles are blue and the front parts as shown in the photograph are crimson piped with a thin aluminum stripe. Radio mast is blue. External brace struts are crimson; propellers aluminum; windows aluminum. Insignia is also aluminum with letters A A in crimson.

The lettering and license numbers on the wing are as follows: On the upper right and lower left the license number NC—14141 in aluminum. On upper left and lower right the letters A A (American Airlines) in aluminum. The wing stubs or center section part of the wing which is inboard of the dotted line, letter G, is painted blue.

When the paint has fully dried, place the lead weight or lead foil in position temporarily and begin gliding experiments both indoors and out. Add or remove as much weight as you find necessary.

What's New In Planes

(Continued from page 5)

information because it is a new military ship—and because we have not been able to obtain the details anyway.

The vertical tail of the DC-4 is so large that the engineers at Douglas decided to divide the large single unit into smaller separate units as Lockheed has done with their transports in order that the ship may be able to fit inside a hangar. With the original tail they would have had trouble getting the plane out of the Douglas hangar, now the world's largest airplane hangar.

One great difficulty in building such a giant all-metal ship as the four-engined DC-4 is that various phases of metal construction are not thoroughly known as yet. More research is needed. The Douglas Company lately has been conducting research of its own on simple types of channels to find out more accurately just what strength there is in them. The design of many of the parts of the DC-4 will depend on these tests. Methods in metal aircraft construction are developing so rapidly that aeronautical engineers are being kept very busy these days. No sooner is an airplane almost completed when it is found that some of its parts can be manufactured much lighter. They are replaced to make the ship more efficient which of course delays its completion. This is true of the DC-4.

It has been found that castings can be made with as small as ⅛th webbing. These will be substituted for the original heavier castings in the DC-4 which when all totaled will be a weight saving of a couple of hundred pounds.

The second of Douglas' DF flying boats has been test flown. The first was crated at Alameda, California, and we hear it went to Japan. The second is for Russia! It is a very beautiful ship with red wings and blue fuselage. Carl Cover test hopped the job in the Pacific. Unfortunately during the tests a log punctured a hole in the hull. The ship was hauled up on the Santa Monica Beach, and the slight damage was repaired there. The hull of the DF has no keel. All stresses are taken up by a series of stringers.

Waldo Waterman has test flown his latest creation at Santa Monica. It is a flying wing with detachable wing panels. The panels may be taken off and hung up in a hangar, and the fuselage may then be driven as an automobile. On the same field at the same time Douglas test hopped the first of their YB-18 bombers for the Army.

The tabs on the new C-37 Cessna, an improved version of the preceding C-34, will be electrically operated.

Charles Tracy, aviation editor for the Toledo News-Bee, writes in his column that on the Western outskirts of Fremont, Ohio, a concern known as the Standardized Aircraft Co. is building a high-wing monoplane with a span of 33 feet. It will be powered by a four cylinder 125 hp. Menasco engine and will carry two passengers and 40 pounds of baggage. Top speed will be 135 m.p.h., cruising 115 m.p.h. and landing speed will be 42 m.p.h. The price for the plane will be about $2,700. Mr. Hise, formerly of the Glenn L. Martin Aircraft Co., is the designer.

As we go to press, Roscoe Turner's all-metal mid-wing racer is set for its first test flight. The ship should do about 425 m.p.h.! Frank Hawks' new racer has had fairings put on the landing gear to cover the gap in the wing when retracted.

Roy Hunt, famous stunt and race pilot, has designed and will soon build a stunt biplane for forthcoming National Air Races. It will be the only airplane in the United States built expressly for stunting. Roy will have charge of the construction of the ship himself.

"Jane's All the World Aircraft for 1936" contains much in the way of news of proposed airplanes as well as those that have already been completed. It states that in Belgium the Tipsy Company is to produce a twin-engined mid-wing with two 30 hp. Ava four-cylinder engines. It will be a two-place pusher airplane.

There is also mention of Caudron's new twin-engined bomber that will look much like the Junkers 86 bombers. A new Latécoère 521 flying boat is to be built which will be twice the size of the Lieut. de Vaisseau Paris, or in other words it will have about a 324 foot wingspread. There will be eight engines in the wing of 1,000 hp.

each. There will be four rows of propellers, two in each row turning in opposite directions to eliminate torque.

Lioré-et-Olivier of France has designed a C-34 autogyro for the army according to the annual year book.

In Germany, Gotha, who built those famous giant bombers during the war, is now in the aviation business once more. Their first production is a 240 hp. Argus powered training airplane.

Holland's latest is a Fokker four-engined F-56 mid-wing 56-passenger landplane transport. There will be four dressing rooms with two lavatory basins each on the giant transport. It will be a double-decker. Plywood, tubing and cloth are the materials used in construction. Specifications of the F-56 follow:

Span—126′ 3″.
Length—84′ 7″.
Wing loading—23 lb. per sq. ft.
Top speed—221 m.p.h.
Cruising speed—191 m.p.h.
Range—945 miles.

Span of the new Armstrong-Whitworths for Imperial Airways will be 123 feet and length 110 feet; 42 passengers will be accommodated.

The secret is out! The Rolls-Royce Merlin engine develops 950 hp. A smaller and much finer version of the Fairey Battle has been designed with this engine.

Four new Burnelli designs are being built in England. They will be known as the Clyde Clipper, 16-passenger 245 m.p.h. transport; Clyde Carrier, freighter with five-ton load capacity; Clyde Corsair, all-metal bomber; and the Clyde Comet, twin-engined fighter equipped with a 37 mm. quick firing cannon.

Heinkel's latest creation is a two-seater mid-wing fighter with a V engine and extremely long fuselage. Heinkel is a German company. Another fine German airplane is the Hamburger (don't laugh) Ha. 139 four-engined seaplane for catapult work.

Ranger will soon come forth with another new commercial engine.

Did you know that the wing on Howard Hughes' record-breaking racer has plywood covering about an inch thick? It was put on the plane about an inch and a quarter thick and was then shaved down to give the wing a perfect airfoil section. In this way a very smooth surface was obtained.

Starting an epochal 3,000 mile test flight of the single-bladed airplane propeller, which has been hailed in many quarters as the most revolutionary aeronautic development in years, Lieutenant Arthur Seger Peirce, of the Taylor Aircraft Company, will take off next week with a Cub "flivver plane" powered with the new invention for the Pacific coast.

The flight will be a service test of the abbreviated propeller to determine its adaptability under all weather and temperature conditions. After a leisurely flight, conducted in the same manner that a private "flivver plane" owner would take a jaunt to the west coast, the propeller will be exhibited at the Pacific Aircraft Show in Los Angeles, California, from March 13 to March 21. Lieut. Peirce plans to visit Pittsburgh, Cleveland, Chicago, St. Louis, Tulsa, Dallas, San Antonio and many other cities enroute.

Invented by Baltimore Engineer

Observers stared in astonishment recently when a Cub monoplane propelled with the single-bladed propeller landed at Floyd Bennet Field, in Brooklyn, New flork. It was flown to Brooklyn from Lancaster, Pa., by its inventor, Mr. W. W. Everts, of Baltimore, Maryland.

Mr. Everts has been working on propeller design for eight years. Six years ago he patented a variable-pitch propeller with spring action. Four years ago he dropped that, brought out a variable-pitch prop with manual control and two years ago patented one which was automatic with constant speed. His odd one-sided airscrew was patented last May, put through exhaustive tests, proved practical in actual flight and was flown to the National Aviation Show in New York City to confound aviation "wiseacres."

When the first flights with this radical propeller were announced by the Sensenich Brothers of Lititz, Pa., it was looked on as a freak. After Mr. Everts flew the Cub propelled with his invention to New York, veteran pilots looked astounded and remarked that "It can't work but it does." Aeronautical engineers scratched their heads, figured a little and then started chuckling about the simplicity and soundness of the mechanical principles embodied in the new development.

After the first tests it was found that the Everts propeller stepped up the speed of a Cub "flivver plane" by 25%. The rate of climb was increased one-third and the take-off run decreased fifty per cent. In addition the half-propeller eliminated vibration and gyroscopic action.

A contract for the purchase of six new 32-passenger transport airplanes by Transcontinental & Western Air, Inc., has been signed with the Boeing Airplane Company of Seattle, Washington, according to Jack Frye, president of TWA.

The new TWA transports will be powered with four engines and will be the largest airplanes in service in the United States. The gross weight will be 42,000 pounds. Work on the first of the new TWA Super Skyliners has already started. It is planned to place them in service in the spring of 1938.

Simultaneous with the announcement of the purchase of the new planes, Mr. Frye stated that TWA had ordered 36 additional Wright G-100 heavy duty Cyclone engines to power the ships. Capable of producing 1205 horsepower, the new Cyclones are the most powerful air-cooled radial engines in the country in production. These engines are the same as those being installed in TWA's Douglas airplanes now nearing completion in California. Installation of four of the Wright G-100 Cyclones in the new TWA Boeing plane will give the ship a total of 4820 horsepower.

In all, the 77 Wright Cyclones now on order for Transcontinental & Western Air will be capable of producing a total of 92,785 horsepower.

In making the announcement, Mr. Frye stated:

"The purchase of these planes which will be the first of the modern four-engined transports to go into service in this country, is a step in a general expansion program being undertaken by TWA.

"In all, approximately $4,300,000 is being spent by the company. The new Boeing fleet, together with spares and equipment, will cost approximately $2,043,000. Other funds are being expended for other new twin-engined equipment, for research and development and for improvement of ground facilities."

Concerning the new Boeings, Mr. Frye had this to say:

"Recently we completed a series of experiments in high altitude flying which convinces us of the practicability of seeking higher levels. These experiments were carried on in the Northrop Gamma 'Overweather' airplane, which was on exhibit at the National Aircraft Show.

"Whereas our experiments were conducted between 30,000 and 36,000 feet, we do not plan to operate the new planes at this level but expect ultimately to carry passengers at 20,000 feet in these airplanes through the addition of cabin pressure equipment. The passenger cabins of these planes will be structurally designed and built for supercharging.

"At the present time our Douglas Skyliners are operating at levels between 6,000 and 10,000 feet, and we expect to start operating the new Boeings at about this level. Later, when we have been able to adapt the experience gained in high altitudes to the four-engined transports, and when the installation of the necessary equipment is perfected, we will gradually start flying at higher altitudes.

"With 3600 horsepower, the speed of the airplane will be in the neighborhood of 250 miles per hour at higher cruising levels.

"The new four-engined transports will be equipped with berths for eighteen and seats for eight when flown on night schedules, and with thirty-two seats when operated as day planes. They will be equipped to carry 3750 pounds of cargo in addition to the passengers. It is interesting to note that this cargo load is greater than the entire payload carried in the present day twin-engined transport airplane."

How to Build a Scale Model of the Lockheed 14

Make the entire plane of balsa wood which may be purchased in any model shop or department store. If you wish to square off the plans, making it easier for measuring, join the corresponding dots on the border with straight lines. Each square will equal four square feet. Get dimensions from plans.

Draw the side view of the fuselage first and cut to shape with a jig-saw. Be sure the grain of the wood is running lengthwise. Then draw top view and cut once more. Shave down the corners as shown by the cross-sections with a razor blade or small sharp chisel. Go over the surfaces with coarse and then fine sandpaper, and the fuselage will be finished.

Use the same procedure in making the wing panels, tail, and engine cowls and nacelles.

Sandpaper all parts thoroughly once more, then begin the assembly. Lay the fuselage in flying position on a flat surface and join the wing sections to it with model cement. Put blocks under the wing tips to give them the required dihedral. Join the tail in place next and when that has

dried put the engine nacelles in place.

Shape out six small prop blades from scrap wood with your razor blade. Using two small pieces of wood as hubs join three blades to each one with cement. Connect these to the front of the nacelles with pins. When all parts are put on, sandpaper the model once more and fill up all connections with cement.

Paint the model silver with white windows. Many coats will have to be applied before a smooth finish is obtained. A small stand may be purchased or made for the model.

Build and Fly the Westland Cooperation Plane

(Continued from page 21)

Covering and Doping

It is best to cover each wing section with two separate sheets of white tissue. One sheet will cover from rib A to rib D on both the top and the bottom, while the second sheet will cover from rib D to H and if the paper will go on smooth this sheet can be continued to the tip. Begin to cover the wing at the top of the trailing edge, bringing the paper forward down over the leading edge and back to the lower side of the trailing edge. If the paper is glued only at the trailing edge it will tighten up very well after the water has been applied. The tail sections are covered with a piece of white tissue on each side. It is only necessary to put banana oil on the edges of the tail pieces when covering them. The fuselage is best covered with a number of pieces of tissue rather than one or two because of the elliptical shape of the fuselage cross-section. It is recommended that you cover one or two sections at a time. When we say section when referring to the fuselage we mean the distance between two longerons. The cowling is first covered with a piece of 1/32" sheet balsa and then covered with tissue. The entire plane is covered with white tissue. It may be left this way if a real good flying model is preferred or it may be doped all silver.

Assembly

After the covering job is completed to your satisfaction, start putting the model together. Begin by cementing the tail sections in position. When doing this make sure that they are in the right position and that they are on "straight." The cowling can also be cemented onto the fuselage and then it is best to let the model set for awhile before putting on the wings. The wings are cemented onto the short longeron that runs on each side of the center one on top of the fuselage between formers 2 and 4. See the plans for the exact location. While the plane is drying, the struts can be made. They are cut from a piece of balsa 1/16" x 1/4". Sand to a good streamlined shape and cut to the correct length. This length is best determined by continued fitting of the strut until the correct length has been obtained. The wings are given a 5/16" dihedral angle although the angle in the real ship is zero due to the great natural stability obtained through the use of gull

wings. The bottom of the struts are cemented on landing gear leg while the top is cemented to rib number D. The plane can now be given a coat of water of room temperature using a spray gun. When the model has thoroughly dried, some builders may wish to further tighten the covering by applying a solution of 50% banana oil and 50% acetone with a brush. If the model is intended for scale purposes only the builder should give it a coat of silver dope. The numbers for the fuselage sides are cut out of the plans and using banana oil are cemented to the fuselage sides just to the rear of former number 5. The wing numerals can be cut from a sheet of black tissue. The wing cockades are of the British type and the size is 1½" diameter while the fuselage cockades are ⅞" diameter.

The Propeller and Flying

The scale propeller is three-bladed and each blade is carved from a separate block of pine 2⅜" x ¼" x ½". These blades are cemented to a ¼" hub which is 5/16" long. The flying prop is carved from a single block of balsa 6½" x 1⅜" x ¾". The flying prop is only a standard two-bladed job. Lay out the block as shown in the plans and carve away the darkened sections. Sand the prop well and make it very carefully. Many builders are disappointed when their models won't fly and usually the cause can be laid to a badly carved propeller. Make the rear and front hooks from .028" piano wire. The rear hook is imbedded in the tail plug and the front hook is attached to the propeller. It is recommended that the builder use three or four loops of ⅛" flat rubber of the best quality procurable. It is always best to pay a little more for the best than to buy some cheap substitute which will continually be breaking and more than likely ruin a model which has taken many patient hours to build.

Fly the model in a field where there is some tall grass to break the fall of the model if it is not adjusted right at first. The model may need a little weight in the nose, in which case some lead shot may be glued inside the cowling. This model is something to be proud of as it flies gracefully in circles until the power gives out and then it noses down slightly into a long flat glide and a three-point landing almost every time. If the builder has any trouble constructing this model or in getting it to fly, please write the author in care of this magazine.

Material List

1—1/16" x 2¼" x 24" sheet balsa bulkheads
1—1/16" x 2" x 24" sheet balsa wing ribs, tail pieces
1—⅛" x 2" x 12" landing gear legs
15—1/16" x 1/16" x 18" strip balsa longerons
1—1/16" x ⅛" x 18" strip balsa tail outlines
2—⅛" x ¼" x 18" strip balsa leading edge
2—1/16" x ¼" x 18" strip balsa trailing edge
2—1/32" x 1/32" x 12" strip bamboo cockpit details
3—2⅜" x ¼" x ½" pine block scale prop
1—6½" x 1⅜" x ¾" medium balsa flying prop
1—⅞" x ½" x ⅞" hardwood or pine nose block
1—1⅝" x 1" x 1" medium balsa tail plug

Miscellaneous Items

1—1 oz. cement
2—ounces banana oil (paper cement)
1—1 oz. acetone
4—1½" insignia (British)
2—⅞" insignia (British)
1—12" .028" piano wire
1—brush
1—8 feet ⅛" flat rubber
1—1 sheet white tissue
1—½ sheet black tissue (for numerals on wing)
1—1 sheet cellophane 6" x 12"
1—pr. 1¼" balsa wheels
6—washers (brass)
1—ounce silver dope (for scale model only)

Designing Your Model For Distance

(Continued from page 17)

inches long, the span then will be twenty-seven inches. This is the maximum advisable span if straight flights are desired.

Chord

The chord of the main wing should be comparatively large in order that the wing will have sufficient area to support the weight of the model at a reasonably slow flight speed. A chord of 4.25 inches will give an aspect ratio of slightly more than six. This fairly low aspect ratio can be tolerated if the wing tips are carefully raked. The eliptic form of wing tip is advisable because of its high efficiency. Tnis wing proportion will result in a wing area of about 108 square inches, allowing (7 square inches) as being lost by rounding or raking the wing tips.

Camber

The correct value for the wing camber must be determined next. On distance models *very little* camber should be used. A value of 1/16th to 1/14th the wing chord gives best results when single sur-

face wings are used and 1/14th to 1/12th the chord when the wings are of the double surface type.

Many readers may wonder why a higher camber is not used in order to reduce the speed of the plane. There are several reasons. First of all, *a low plane speed* is not as important as a *low propeller tip speed,* for the lower the "prop" tip speed is, the more the power, which is stored in the motor, is converted into thrust instead of being wasted by covering distance *at a high speed.* More total distance can be covered by the plane at a slow propeller tip speed than at a high tip speed, with less power required.

The object, therefore, is to obtain as high a plane speed as possible *compared to the propeller tip speed. If fairly high plane speed can be produced with a low propeller tip velocity then you will have a very efficient distance model.*

This means that for any given unit of power expanded the airplane will travel a long distance forward. This naturally makes long flights. Thus in order to reduce wing head resistance and to be assured of a high lift to drag ratio a low camber is required, for a low camber not only gives a low *total* head resistance but a high lift relative to the drag.

If, in his search for suitable wing sections, the model designer comes upon a medium camber section such as the *Clark Y,* that gives a high L/D ratio, but is at the same time a medium speed section, he may use this section and be sure the results will be satisfactory. The reason why high lift sections are not advisable is that their L/D ratios are usually *comparatively* poor, and the propeller blade area has to be made excessively large: not because of the high camber alone, but because of the *combination* of high camber and the *high propeller pitch* which must characterize a good model. *High pitch,* in the first place, requires *large propeller area* in order to make it effective.

So it seems that the average distance model will be a comparatively fast airplane because of the necessary high propeller pitch, even though a slight loss of power efficiency results because of increased parasite (structural) resistance due to the higher speed. The whole situation hinges on the fact that the loss due to high speed is not as great as the loss of aerodynamic efficiency and increased weight due to high wing camber and *excessive* propeller blade area.

An important factor which favors a comparatively high speed is the necessity of a straight flight. The higher the speed, the less the air currents or gusts will turn the model from its straight flight course.

Angle of Incidence

The angle of incidence of the rear wing of a twin pusher distance model should be from zero to two degrees positive. Usually the wing is placed directly on the same longerons, approximately on the line of thrust.

Elevator (Front Wing)

On any twin pusher the weight of the airplane is supported partly by the rear or main wing and partly by the smaller front wing or elevator. The purpose of this elevator is to stabilize the model. This stability results from the difference in *relative* lift between the rear and front wing at various speeds. At high speed the front wing lifts relatively more and at low speed relatively less than the rear wing. Such action is secured by placing the front wing at a greater angle of incidence than the rear one. Usually the angle is about two degrees more. Because of this larger angle of incidence the lift of the front wing is larger per square inch than the rear one. Thus it may be smaller and yet lift an equal amount of weight. It is also less efficient due to its large incidence angle and it is advisable, therefore, as well as possible, to make it quite small.

The best results are obtained if it is made with a span of about *35 per cent* the span of the rear wing. In this case its

span would be 35 per cent of twenty-seven inches, or 10 inches. The maximum chord should be about one-third the span, or about 3¼ inches, provided that the tips of this smaller wing are raked or the whole wing tapered, as shown in Fig. No. 126. If a straight wing is used the chord should be about 28% of the span, or 2¾ inches. The tips of such a wing should be rounded. Best results, however, are given by the tapered type of front wing so it should be used on your distance plane.

The wing section should be the same or similar to the section used on the rear wing.

This small front wing, though less efficient than the rear one, performs a very important function. It provides directional stability as well as longitudinal stability. This means that it helps the model to fly a straight course; an essential quality of the distance plane. It does this by means of the very large dihedral which should be given to it. Each half wing should be raised so that it forms an angle of about thirty degrees with a "horizontal" line passing through its center section (Fig. No. 126).

Its best location on the model is a point very close to the front end of the "vee" frame. It may be placed directly on the frame at a four degree angle of incidence or raised above the frame as a parasol wing, an amount equal to about one-tenth its span. In this case its angle of incidence may be one or one and a half degrees less. The high center of drag of the parasol setting creates a nosing up tendency under high speed, similar in effect to the *difference* in angle between the rear and front wing. If the rear wing is set at (0°), the front wing may be set at (½°) to (1°) positive angle when it is "parasoled."

Propellers

Now we encounter the most important part of the twin pusher distance plane design, and that is designing the propellers. The first characteristic to consider is the diameter of the propellers. The value of this is governed by several factors. First of all, by the amount of *pitch* to be used. We know that the propellers must have a high pitch in order that they will turn slowly and yet have the plane cover a large *distance* per revolution of the "props." It is wise, for the sake of efficiency, therefore, to have a *large diameter* so the blade angle at the propeller tips will not be excessive. A very large blade angle *beats* the air if very large blade area is not used. However, a large propeller diameter will cause a high resistance when the power has run out and the model glides. Also the larger the propellers the greater the structural weight will be. Both of these conditions are undesirable.

In order to avoid poor results from either one of these conditions it will be necessary to strike a happy medium; that is, use propellers of medium diameter. The average diameter for each propeller of a twin pusher is a diameter of about 35% of the wing span. This is equivalent to about ten inches. The requirements of high pitch makes it necessary to have a diameter value of this amount at the least. Actually this value for the diameter is small relative to the length of the frame because the wing span (which governs the diameter) is small. Practice has shown that a propeller diameter of ten inches on a distance model of this size is about the right amount. The two props should be ten inches each, from tip to tip.

Pitch

The next characteristic to be determined is pitch. It is very important in a distance plane that the *pitch should have a very high value.* This is required in order that they may revolve slowly and not have a high tip speed; for the slower the tip speed the more the power of the motors will be converted into *distance travel.*

On the other hand, if the pitch is very high excessive blade area will be required. This not only adds weight but causes great drag when the plane is gliding, even though free wheeling propellers are used. Therefore, a happy medium for the pitch value must be selected. Practice has shown that a pitch equal to about twice the propeller diameter is most efficient. A pitch of (2.2) times the diameter has been used very successfully on many models.

As the diameter of the propellers is to be ten inches, the pitch should be from twenty to twenty-two inches. A pitch of twenty-two inches is suggested, especially if you are looking for an interesting and enlightening experiment.

Blade Area

The last factor of the propellers to be determined is blade area. As a very high climb is not required, a medium amount of blade area (relative to the pitch) may be used. The blade area of propellers on tractors when the pitch is 1½ times the propeller diameter should be about 10% of the wing area for average conditions. As in the case of the *speed twin pusher* the wing area to be used as a basis of propeller area calculation is determined by adding together the area of the rear wing and twice the area of the front wing. The area of the rear wing is 108 square inches. The front wing will have an area of about 24 square inches when the span is nine inches and the average chord is two and three fourths in., the tips being rounded. The area will be the same if the wing is elliptical with a span of ten inches and a maximum chord of 3¼ inches. So the *effective* wing area for blade area computation will be [108 + 2 (24)] = 156 square inches. (Contest classifications are based on the area of the *rear wing* only, in duration events.)

Now as the propeller pitch is to be 2.2 times the diameter it is obvious that the blade area (total) will have to be much more than 10% of the wing area. How much more is determined by means of a simple formula that was given in the sixth article of this series, July 1932 issue. It is:

$$A = K\left(\frac{AP\sqrt{P}}{1.5D\sqrt{1.5D}}\right),$$

in which (a) equals the total blade area; K=a constant depending on the angle of climb desired; in this case for a medium climb it is (0.1); A=the effective wing area; P=the propeller pitch; and D=the propeller diameter. This formula is for a wing camber of 1/12 (single surface) of the chord. As our wing will have a camber of about 1/16 the chord for single sur-

face wings or 1/12 the chord for double surface ones, the answer given by the formula will have to be multiplied by (0.75). It may be worked out as follows:

$$A = 0.1\left[\frac{156(22)\sqrt{22}}{1.5(10)\sqrt{1.5(10)}}\right]0.75 = 0.075\left[\frac{3432(4.7)}{15(3.85)}\right]$$

$=0.075\ (280)=21$ square inches of total propeller blade area. As there will be two propellers on the model, each propeller should have a blade area of 10.5 square inches. In order that each propeller will have this amount of blade area, it must be cut from a block the dimensions of which are 10" long, $1\frac{7}{16}$" wide and 1" deep. These dimensions are determined by solving the following formulas as described in previous articles of this series. The formulas are:

$$w = \frac{d\sqrt{7}D}{P}, \text{ and } (a) = \frac{(\sqrt{d^2+w^2})+d}{2}(0.8)D.$$

Solve for (w) in the first formula and substitute its value in terms of (d) in place of (w) in the second formula.

The propellers should be cut from medium hard balsa blocks, using the diagonal method which gives a helical pitch propeller. One should be cut as a right hand propeller and the other as a left hand one. The tips should be rounded.

Motors

Each propeller should be driven by a motor composed of from ten to twelve strands of brown rubber, each strand of which is $\frac{1}{8}$" x 1/30" in cross section. The number of strands required will depend on the weight of the model.

If your distance twin pusher is built as outlined here, its performance should be hard to beat.

Airways—Here and There

(Continued from page 26)

Australia

Picture No. 10 comes through the courtesy of Mr. Ivor Freshman of 67 Liverpool Street, Sydney, Australia. It shows a group of model fliers at the contest between Bundaberg and Maryborough. These two districts are in Queensland, Australia. Mr. F. Therkelsen is largely responsible for the good work carried on here by these clubs. A great variety of models appeared at the contest and some of them are shown in the picture.

England

Mr. John Pearce of 26 Elms Road, Heaton Moor, Stockport, England, who is secretary of the Lancashire Model Aircraft Society, sends us picture No. 11, showing his biplane "Fantom" before it was covered. Mr. Pearce upholds the reputation that British builders have for neat construction. He says the model has an average performance of fifty seconds. The construction is almost entirely of balsa wood.

South Africa

Africa has never been noted for crowds. Picture No. 12, which shows Mr. Lilly and Bob Sinnitt battling with a motor of one of their ships, confirms this idea. We are indebted to Mr. V. C. Gracia of "Xenia", Southfield Road, Plumstead, Cape Province, South Africa, for this picture and information. By looking closely you will see four or five models on the ground, waiting to be flown. Those familiar with model flying in the city will find it hard to imagine this scene taking place at Van Cortlandt Park or some other municipal location. One would not be able to see the models for the crowd.

Mr. Gracia is a member of the South African Model Airplane Club, and he says:

"Some of the beginners are flying their stability planes, built from data obtained from Mr. Grant's articles, in terrible flying weather just to show their pals what can be done. This is how we get new members."

New Zealand

News comes from Mr. W. B. Mackley of 8 Ascot Avenue, Remuera S. E. 2, Auckland, New Zealand. He is club secretary of the Auckland Model Aero Club. He says that a series of flying contests were held in January by the North Island and Northern Districts Model Airplane Associations. The weather was poor which accounted for some poor flights. The results of the various events were:

T. Chennery Brown won the Glider H. L. Event with a time of 47 seconds. The Auckland Provincial Championship Cup Event was won by R. Court with a 2 min.,

1⅜ sec. flight. The Star H. L. Event was won by W. B. Macley with a flight of 2 min., 11⅘ sec. Mr. Mackley, with a total time for three flights of 213⅘ seconds, (best time 1 min., 56⅖ sec.) also won the Hodge Championship Trophy for Fuselage models. Picture No. 13 shows a very efficient contest model built by him.

CLUB NEWS

Hartford, Connecticut

Mr. C. Donald McKelvie of the Y.M.-C.A. of Hartford, Conn., writes us concerning the proposed annual Connecticut Model Airplane Contest. It will be held at Rentschler Field, East Hartford, on Saturday, June 5th.

"This year, in addition to the regular outdoor events and scale model contest, there will be a gasoline model event open to anyone in New England, with no restriction as to age.

"The Meet will be sponsored by the United Aircraft Corporation, the Connecticut Model Airplane Association and the Hartford Y.M.C.A.

"Gas model enthusiasts may get the rules of that contest from C. Donald McKelvie, at the Hartford Y.M.C.A. All contestants will be under N.A.A. rules. There will be a Junior and Senior classification in the flying and scale model events."

New York City

Another event of interest is the official opening of the World's Fair Hobby Olympics, sponsored by the Hobby Guild of America. It started Monday, March 15th, 1937, and will conclude on June 30th, 1938. For full information write to the Hobby Guild of America, Knickerbocker Hotel, West 45th Street, New York City.

NEW UNITS

Allentown, Pennsylvania

We are pleased to announce that a new unit of the Air Ways Club has been formed. It is called the Flying Keystone Model Airplane Club. On December 19th the club held its third monthly indoor contest, which resulted in some fairly good times, considering that the ceiling was only twenty-eight feet high. The winners of the events were as follows.

George Micott won the R.O.G. Class A Event with a flight of three min., eighteen seconds. The Stick Event was won by Russell Fahringer whose tractor flew five min., forty-two seconds. The Cabin Event was won by George Micott with a time of three min., seven seconds.

Jacksonville, Florida

The Jacksonville Model Club of 2048 Roselle Street, Jacksonville, Florida, will start their yearly activities by holding a contest on Saturday, April 11th. Another contest will be held about the middle of June, and still another about August 15th. The fall meeting is usually held during October. Those who are interested in attending the contests should write Mr. William L. Timpone, club advisor, at the above address. Mr. Timpone has guided the club in its activities during the past two years.

Akron, Ohio

Mr. Pershing Kaufman of 792 Elma Street, Akron, Ohio, president of the Akron Model Aero Club, writes us that his club wishes to become a unit of the Air Ways Club. We are indeed pleased to have this active society join our organization. Anyone who wishes to correspond with this club should write the secretary, James Weber at 653 North Howard Street, Akron.

Mr. Kaufman sends us a picture of a model built by one of the club's members which will be published in a later issue.

Boston, Massachusetts

One of the most interesting and best attended meetings ever held by the Jordan Marsh-Boston Traveler Junior Aviation League was in January. Mr. Gunnar Munnick, a pioneer in the field of model aeronautics, conducted the gathering and presented an informal talk on the history of model airplane building and the progress the sport has made during the past twenty years.

Readers may be interested to know that the 8th Annual New England Championship Model Plane Meet is scheduled for the latter part of May, probably on the 22nd and the 23rd.

A cordial invitation is extended to all New England model builders to compete in or witness the 8th New England Championships. More detailed information may be obtained from Albert Lewis, Juior Aviation League, Jordan Marsh Company, Boston, Mass.

Chicago, Illinois

We hear from Edmund B. Swort of 102 West 72nd Street, Chicago, Illinois, who writes us as follows:

"I have been appointed to send news of the 'Chicago Aeronuts' model activities so I shall do my best. We have set up a club contest program to see what can be done in the way of bringing more records to this city. So far our efforts have been meeting with success. On January 2nd four official indoor N.A.A. records were established; they were:

Event	N.A.A. Official	Unofficial
Junior Autogiro—		
Milton Huguelet	1:20	2:52
Senior Autogiro—		
Richard Obarski	2:26	2:47
Open—Carl Goldberg	:54	2:18
Ornithopter Senior—		
Edmund Swort	:33	

"A contest for ornithopters was held on January 30th at Hamilton Park, the ceiling of which is under thirty feet. The results were:

"Dennis Turner was first with a time of 2 min., 21.6 sec., which is a senior record. Edward Swort was second with 2 min., 4.6 sec. Milton Huguelet was third and made a junior record with 1 min., 36.8 sec. Carl Goldberg was fourth with 1 min., 28 sec., which is an open record. John Kubilis, with a time of 1 min., 17 sec., was fifth.

"Anyone who would like to receive our official organ, the 'Aeronuts Bulletin', may send such a request to the editor, Tom Cunningham, 1039 Hollywood Avenue, Chicago, Illinois. For the benefit of any Chicago model builders who are interested, the 'Aeronuts' meet at Gage Park, 2411 West 55th Street, every Saturday at 2:30 P.M.

"Gas Lines"

(Continued from page 12)

terest. Mr. Bob Allen of 7041 Frankstown Avenue, who is director of western Pennsylvania and who is responsible for the organization of our largest unit, No. 3, sends us a few notes on his activities. He says:

"Recently I was invited to be the guest of honor at the First Annual Banquet of the Tarentum Y.M.C.A. Gas Model Club, which is affiliated as a group of Unit 3, I.G.M.A.A., under the able directorship of Mr. James Faucett. This is one of the most active groups under my jurisdiction, and is really doing things with the help and cooperation of the Y.M.C.A. in that town. The "Y" has set aside two large rooms as work rooms and supplied them with such power tools as they need, including bandsaws, jig-saws, and lathes. If you figure that out of twenty members, there are twenty-one ships, flyable, that is not so bad in a town whose population is under 3000. Those twenty members consist of sixteen boys and four girls and there are, as interested spectators and possibly future members, nine adults who attend every meeting and supply a little cash here and there for needed material. Included in these is Mr. Shook, the Executive Secretary of the Tarentum Y.M.C.A. The banquet was a grand success from cocktails down to pie, and prepared by the group director, Mr. James Faucett, in I should say a workmanlike manner. I think that the Tarentum Y and the members of this group of the I.G.M.A.A. and Unit No. 3, deserve a great big hand and a lot of congratulations on a year's existence crammed full of activities, contest, and general building."

We are sure Mr. Allen is right in suggesting congratulations for Mr. James Faucett. He can consider himself congratulated.

Mr. H. W. Badstubner, president of The Gas Model Airplane Association of Southern California, of 5115 West 106th Street, Inglewood, Calif., writes that this organization has elected Mr. Grant as an honorary member. This Association is also unit No. 23 of the I.G.M.A.A. Mr. Badstubner gives several interesting pointers in respect to how their organization is handled. This may be valuable to other units. He says:

"Our group is strictly amateur, in that our requirement for active membership is that the applicant either has, or is constructing, a gas model airplane and, that he or she is not engaged in the sale or manufacture of model airplane supplies. Only active members may hold elective offices. Members who are engaged in the sale or manufacture of supplies are classed as reserve members and may hold appointed but not elected offices. This has been a very effective method for keeping harmony among our supply houses. We now have over ninety members in our organization and are justly proud to be known as one of the largest units of the I.G.M.A.A."

Raymond Santee of the 53rd Squadron, Randolph Field, Texas, and president of unit No. 21, sends us picture No. 13. This is a picture of his latest model, Miss America, powered with a Cyclone engine. Mr. Santee is on the right and the other young man in the picture is Jimmy Martin, Santee's helper. Mr. Santee says:

"I have never put over twelve c.c. of gas in the tank. The average flight I have obtained is eight minutes, the longest flight being twenty minutes. The best altitude attained has been 4000 feet."

Santee also makes a very pertinent remark. He says:

"Many persons insist gas models should be built to the scale of a real ship, since by using a gas engine they are more lifelike. I believe more composite models should be built because it is only by introducing new designs that gas model building can further aviation."

Francis R. Stevens of 4911 44th Street NW, Washington, D.C., secretary of unit No. 31, notifies us of the enrollment of eighteen new members. He says in his letter:

"Your publication of our unit organization in MODEL AIRPLANE NEWS has caused a landslide in new applications, which we appreciate very much. We now have nearly every gas modeler in Washington in our club. The new members are:

"Donald Scott, John Beebe, Richard Stolus, John C. Lawler, Donald Ludwig, Kenneth Ludwig, Ernest Violett, William Walsh, Warren Barwell, Paul R. Yowell, Bob Wielele, Henry Putman, Dick Knight, Page King, William Barger, Johnny Jones, Carter Squire and Robert Platt."

Mr. R. N. Ferrario of 508 South Main Avenue, Scranton, Pa., treasurer of the Anthracite Gas Model Club, unit No. 22, writes as follows:

"Our members are building a Flying Quaker gas model which will be powered with a Brown Junior engine. At this writing the model is in its final stages of completion and will be ready for flying very shortly. John Galdiere is also building his own gas model, which is a Red Zephyr to be powered with a Brown Junior engine."

The I.G.M.A.A. takes the greatest pleasure in announcing that Mr. Leo Rutledge of 243 South Rutan, Wichita, Kansas, the advisor and sponsor of unit No. 37, has been appointed State Director of the state of Kansas. Mr. Rutledge has been a pioneer in model activities in this state and it has been through his efforts that interest in gas models was started.

All Kansas units should report to Mr. Rutledge at once so that he may become more intimately associated with the activities of Kansas gas modelers. He will be pleased to supply information concerning the Association.

The I.G.M.A.A. congratulates Mr. Rutledge on his outstanding work and tireless efforts.

Great activities are being carried on by unit No. 37, of which Fred Just of 215 North Dodge Avenue, is secretary. Recently they gave a gas model airplane demonstration in the Hotel El Dorado, for the benefit of the Metro Club. The demonstration was conducted by Lewis Shore, Donald Sump and Mr. Rutledge. The Metro Club voted to sponsor a model airplane club at the Junior High School and hopes to build interest up to the point where a large number of indoor and outdoor contests may be held later.

It certainly looks as if our Kansas group was "putting it over."

New Units

A new unit has been formed at the Yakima, Washington, Y.M.C.A., which is directed and sponsored by Mr. Richard D. Megorden. Picture No. 14 shows a group of club members and some of the gas models they are building. This picture was taken in their first workshop before they outgrew it. At that time their membership was only seventeen. Mr. Megorden writes:

"We now have a membership of 27, all of whom are busily working on their gas models, getting ready for the big gas meet planned for this coming spring. (The exact date of this meet has not been set).

"I find that elderly men and exceedingly interested in what we are doing. As a matter of fact some of our members have complained that their dads had become so completely taken by their motors when first run that friction developed over who should run them on later occasions. Our oldest member is 40 years, and our youngest is 12 years.

"The officers of the club are as follows—
Pres.....Richard D. Megorden
Vice Pres.....Roy Allison
Sec.-Treas.....Gordon Cerswell
Sergeant of Arms.....Joe Wherry"

Picture No. 15 shows the first gas model constructed by the Linden Model Airplane Club, with headquarters in the Old City Hall, Linden, New Jersey. The model was built from a Flying Quaker kit and powered with a Baby Cyclone motor. It took about three weeks to construct and flew successfully on the second flight. Though it was lost on one of its flights, fortunately it was found by a student pilot from Westfield Airport, who returned the model to the club. We wish to extend the thanks of the Association to this pilot for his extreme courtesy and adherence to the recognized code of ethics of aviation.

Roy Messinger, secretary, tells us that the club is experimenting with a Kodak timer. The plane to date has made about twenty-five flights. The model in the picture is shown with Frank Yuhasz, club treasurer, who is now enrolled at the Casey Jones School of Aviation. There are twenty-three active senior members in the club. Three gas jobs have been constructed to date.

One of the I.G.M.A.A. latest units is the Wiley Post Gas Model Club of 1540 Northwest 33rd Street, Oklahoma City, Okla. Activities in this state sprang up only recently among individual members. However these builders got together and formed the above mentioned club. Members were busy during the winter flying models at the Wiley Post Airport, which Mr. Burke, the airport manager, so generously let them use. The I.G.M.A.A. appreciates his cooperation, as well as the help rendered Association members by other airport managers throughout the country.

We are indebted for this information to A. C. Nissen, who also tells us of his own work. He says:

"I have built three gas models, the latest one I hope to enter in the 'Nationals'." Nissen's second gas model is shown in picture No. 16, just after its take-off. It appears that an issue of "Gas Lines" cannot go by without at least one flight picture appearing in it. This machine has a seven foot span and weighs only 3½ pounds. Nissen says for some reason or other it is almost impossible for it to turn away from the wind and it is exceptionally stable.

We take pleasure in announcing that another unit of the I.G.M.A.A. has been established in Australia. It is the Launceston Association of Petrol Model Aircraft Constructors of 243 St. John Street, Launceston, Tasmania, Australia (Unit No. 47). Mr. Fred Steven is the director. The club was formed only a short while ago, the first meeting being held on November 21, 1936.

We hear from Kennard C. Trebil of 619 North Third Street, Glendale, Arizona. He is forming an I.G.M.A.A. unit there with six other builders who are very active. Up to the present time Mr. Trebil has a total of sixty-six flights with one of his planes, over a period of five months. He is most anxious that model builders from other units and states communicate with him so that he may exchange ideas.

Other gas model clubs have joined the I.G.M.A.A. as units. They are:

The Nativity Gas Model Airplane Club of 801 South Webster Avenue, Scranton, Pa. J. Francis Howarth is the president.

The North Shore Gas Model Club, of 135 Essex Street, Lynn, Mass. Charles Hyde is president and Harold Thompson is secretary.

The Bay Shore High School have a unit called the Sunrise Gas Model Squadron, with Mr. Alfred T. Ploeser as director. Donald R. Towne is president and Jack Wills is secretary-treasurer. All correspondence should be addressed to Mr. Wills at 85 North Penataquit Avenue, Bay Shore, New York.

The Toronto Gas Model Club of 35 Kingsway Crescent, Toronto 3, Ontario, Canada, has been particularly active and would like to increase their membership. All those interested should write to the secretary, Tom Pearce, at the above address.

In Jacksonville, Florida, there is the Prop Twisters Club of 547 West 28th Street, of which Frank Fitzgerald is president and Owens Perdue is secretary. This club meets in the City Recreation Building and is under the direct guidance of Mr. N. L. Maillison, Superintendent of Recreation Activities for the City.

The I.G.M.A.A. Contest Rules

The I.G.M.A.A. Eastern States Contest, to be held on May 22nd at Hadley Airport, New Jersey, will be run under the following rules:

The rules which follow are those drawn up by the International Gas Model Airplane Association. ALL points not covered by these rules are to be translated according to National Aeronautic Association rules and specifications.

(A). Duration Event (Limited Gas)

1. All models shall be limited to a maximum weight of 7 pounds.

2. All models shall be of the fuselage classification as established by the National Aeronautic Association and shall conform to the proportions established by N.A.A. rules. The maximum fuselage cross section shall not be less than $\frac{L^2}{100}$, where (L) is the overall length of the airplane.

3. The amount of fuel that may be used for an official flight shall not be more than (liquid measure) 1/16 oz. per pound of weight of the airplane.

(B). Limited Engine Run (Duration Event)

4. In such events the gas model shall be equipped with a timer or other device which will limit the engine run to 45 seconds or less.

5. The engine run shall not exceed 45 seconds.

6. Any flight made by a model as a contender in this event, the engine run of which is more than 45 seconds, shall be classified as a "delayed" flight.

7. Every flight shall be timed by two timers. Timer No. 1 will stop his watch at the moment the engine "dies" and timer No. 2 will stop his watch at the instant the plane touches the ground.

8. A flight shall be considered ended when the plane touches the ground or any other obstruction.

(C). General Rules Governing ALL Events

9. No flight shall be classified as official in which the airplane does not take off the ground under its own power without pushing. The plane may be guided by one attendant through contact with ONE WING TIP. Such action will not be termed "pushing".

10. Flights may be termed official only when recorded by a stopwatch by an official of the contest.

11. All officials must be approved members in good standing of the I.G.M.A.A.

12. All assistants to contestants are required to be members in good standing of the I.G.M.A.A.

13. A flight may not be termed official when made by a contestant who is assisted in the preparation for flight by one who is not a member of the I.G.M.A.A.

14. A model is eligible for entry in the contest only when it has been built by the contestant who flies it.

15. Models built by two or more contestants may be entered "under a team" contestant classification.

16. Each contestant may be allowed a total of three official flights.

17. A flight is a start that lasts twenty seconds or more. Any flight less than this time or a failure to fly promptly shall be judged a delayed flight. Three successive delayed flights shall be considered as displacing one official flight.

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BIGGEST NEWS
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Specifications

MODEL—Curtiss Robin.
WING SPAN—6 ft.
OVERALL LENGTH—46 in.
WEIGHT OF MODEL—2 lbs. less motor.
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WHEELS—3½ in. air wheels.

$4.95 less airwheels and motor

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✓ CHECK THESE FEATURES

DETACHABLE WINGS and tail assembly. ADJUSTABLE RUDDER and elevator setting. ADJUSTABLE MOTOR SKID accommodates practically every motor on market. Thrust line can be varied. Real airplane type SHOCK-ABSORBING LANDING gear and tail wheel—exclusive with Comet. Prolongs life of model by absorbing landing shocks. DESIGNED after two years of experimentation. Monocoque type, used by newest transports, chosen because of light weight, structural strength, and ease of construction. CURTISS ROBIN chosen because of unusual inherent stability and excellent flyability. MOTOR SKID gives in event of collision—protecting motor. REMOVABLE COWL and hatches for easy accessibility to motor, battery and wing springs.

AT LAST—a Gas Model Kit bearing the **COMET** label! Introduced only after two solid years of grueling experiments, the Comet Gas Model reaches a new high point of **FLYABILITY, COMPLETENESS, EASE OF CONSTRUCTION and VALUE.** Here is a model with many new and exclusive features that will thrill every model builder, containing so many finished and semi-finished parts that you cut building time almost in half! So simple in design and construction that anyone can build and fly this ship. No detail, however small, has been overlooked. Check carefully the features, specifications and contents listed on this page—and compare them with any other gas model kit on the market!

Above all, test flights of amazing duration prove that this model really **FLIES**—takes to the air smoothly and quickly—without delicate adjustments!

COMET

Compare the Contents—

—with those of any other gas model kit. The Comet Gas Model Kit is unmatched for completeness and number of finished or semi-finished parts:

ALL RIBS accurately die-cut to shape, ready to glue in place :: LANDING GEAR WIRES bent to exact shape :: IGNITION SWITCH :: BOOSTER CLIPS :: MACHINE SCREWS and nuts, washers, etc. :: LANDING GEAR, wing holding and tail wheel springs :: PRINTED ALUMINUM cowl sheet and fire wall :: SPECIAL HOOKS and wire fittings all bent to shape :: CEMENT, ½ pint—covering liquid, ½ pint. Red and yellow dope :: 3 SHEETS BAMBOO PAPER :: 2 LARGE PLANS giving all assembly layouts full size, no tracing to complete wing layout :: AIRWHEELS—1 pair 3½ in. dia. inflated :: RUBBER-TIRED TAILWHEEL :: STREAMLINED STRUTS, leading and trailing edges of wing, completely finished :: LEADING EDGES for tail, cowl blocks, etc., ready shaped :: MANY LARGE PRINTED BALSA SHEETS :: SPECIAL BASS BLOCKS listed below drilled, grooved, and slotted, ready to install—landing gear travel block, front, center and rear motor skid supports, tailwheel fork and holder, motor skids, landing gear spreader block :: BIRCH PROPELLER blank, outlined, drilled and tapered, ready to carve.

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Use Any 3/4" to 7/8" Motor

Both models are suitable to be powered with any motors of approximately ¾" to ⅞" bore, which includes any of the Cleveland Tom Thumb series motors, Baby Cyclone, Brown Jr., Mighty Midget, Gwin and others similar. Of course the performance of each model will vary with the engines employed; for with the various sizes (bore and stroke) the power will change and consequently affect the performance of each model's flight. Of course, the best performance may be expected with motors of the largest size.

In accordance with our adopted gas model policy, these dry kits are sold without the power unit, as is the standard practice; and we have also eliminated the supplying of wheels (and wheel shoes where designs require) to enable the model builder to select whatever wheels suit his fancy; and because many do not like wheel shoes on gas models, these may be eliminated entirely. These are eliminated but may be purchased separately if desired. For instance, for these models we have developed 3½" balsa wheels with bronze bearings at only 65c per pair. Wheel shoes to suit either model also available. Per set, with four routed out cavities, drilled to fit up to 3½" wheels only 95c. Of course M & M or any other type wheels may also be employed (3¼" size, $1.50; 3½" size, $3.50). Larger wheels may also be employed if wheel shoes are not used. Thus these dry kits, as ALL C-D kits are now produced, mean that there are no liquids (cements or dopes) supplied, but if you do not have any liquids on hand when purchasing either of the models, we recommend buying at least ½ pint of the balsa wood cement (55c, plus 15c packing charge) to start. Thus you have your own choice of any colors in the dopes you require and especially on quantity you may buy as little or as much as you like.

Here's What These Kits Contain

Before we explain these all-important details, please understand that both models really look beautiful even before the covering is applied. The wonderful appearance of the really strong built-up ribs, (all very simply made in a very few hours) add much of this appearance due to the brand new C-D Principle, shock absorbing landing gear details, adjustable wing struts, removable wings, removable power unit, the movable control surfaces, etc., necessitating the inclusion of many more materials and supplies than the average "gas model kit" contains.

The parts the kits contain are of course all the necessary strips and sheets, balsa wood, pine or bass and aircraft specification plywood, etc., and the necessary curved parts printed out on finest quality balsa, all necessary solid blocks required, all the necessary tough "bamboo" tissue covering, thick celluloid for windshields and cabin windows, heavy music wire (not weak spring wire usually supplied), all the necessary aluminum sheets and tubes, screws, brads, small diameter special wire, etc., etc. A truly worth-while quantity of materials for the price. Of course both models do contain exceptionally large and thoroughly engineered, full size, well detailed, C-D drawings, approximately 20 square feet or more each, authentic in true C-D fashion.

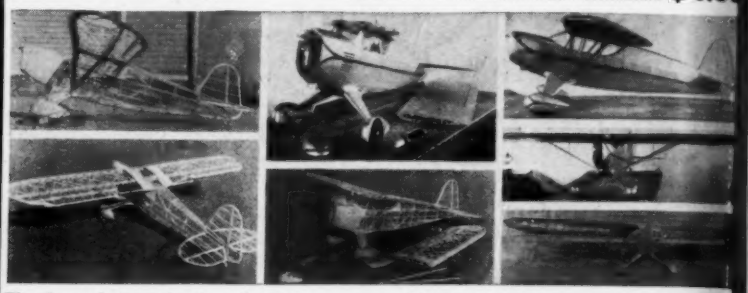
The Stinson, however, includes a well turned cowl front, the balance of the cowl being easy to make the same as are all C-D's and on the Rearwin, besides the solid nose, a shaped leading edge is supplied.

Be First to Build these Great C-D's!

If you're a gas model fan—don't let another day go by without ordering one or both of these keen models. You'll experience a revelation in delight—both in building and flying. Be first in your community. Once you start on one of these you'll never be satisfied with ordinary gas models again. Don't wait—get your kit today!

REARWIN SPEEDSTER GAS-POWERED MODEL

Model recommended to be colored all silver with brilliant red striping and black lettering. Span 64½". Complete plans and details $1.50, deductable from regular kit purchase price (less plans) if purchased within 10 days. Order dry kit GP-69, postfree in the U. S., only $4.85



The above photographs show the many new, fine and authentic appearance features of C-D gas power models. Disregarding all previous gas model practice Cleveland model engineers again pioneer in (to them) a brand new field.

STINSON RELIANT GAS-POWERED MODEL

We suggest coloring to be all silver with blue trimming, black lettering. Span 82". Complete plans and details $2.25, deductable from regular kit purchase price (less plans) if purchased within 10 days. Order dry kit GP-66, postfree in U.S., only $8.50

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